Does nationality matter? The effect of cross-border information on willingness to pay for migratory species conservation

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Abstract

We estimated Israeli and Polish citizens' change in the willingness to pay (WTP) to protect the habitat of a trans-border migratory species, the white stork, due to new information presented to them. This was done by Contingent Valuation study. Few contingent valuation surveys have studied whether households in one country would consider information on how citizens in another country would invest in the same project. The current study addresses that gap. In our study, we randomized split samples with and without information on cooperation. Despite significant WTP for that species, the results regarding the role of information were mixed.

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Although in Israel that information increased WTP, in Poland it did not significantly increase (or decrease) WTP. Socio-demographic variables are also analyzed to reveal potential explanation to these mixed behavior findings.

Keywords: Israel, Poland, contingent valuation, storks, information

JEL classification: H49, Q57

1. Introduction

Loss of biodiversity globally has prompted efforts to induce cooperation among nations (Dallimer et al. 2014; Rands et al. 2010; Tittensor et al. 2014). Trans-border migratory species depend on habitat in more than one country for their life cycle (Haefele et al., 2018). Often, these species provide ecosystem services in one jurisdiction although being supported by habitat in another jurisdiction (Drake et al. 2013; López-Hoffman et al., 2017). This fact calls for cooperation between the respective countries. However, the fact that sometimes the countries involved have different environmental attitudes hampers such coordination.

Biodiversity services are public goods (Rands et al., 2010). They provide benefits at the global level (Perrings and Halkos, 2012), no matter where they are. Nevertheless, in some situations the geographical distribution of conservation efforts may result in significant local values. These may include tourism or local regulation benefits. An important determinant of the value of conservation in such cases is distance to the conservation location (e.g., Bakhtiari et al., 2018; Callaghan et al., 2017; Gökşen et al. 2002; Yao et al., 2014; Revollo-Fernández, 2015; Stevens et al., 2014).

International cooperation is usually more cost-effective than unilateral actions. This is mainly due to greater set of opportunities (Kukkala and Moilanen, 2017). However, the lack of similar national priorities in the different countries, the delayed incorporation of international agreements and the free-riding motive can be thought of as potential obstacles to such coordination of public good provision (Sandmo, 2000; McCallum et al. 2015; Trillo-Santamaria and Pauel, 2016).

Previous research suggests that willingness to pay (WTP) is positively correlated with income in each country (Richardson and Loomis, 2009). Taxon, size, rarity, and a general feeling of empathy are also important factors in willingness to support conservation policies (Knegtering et al., 2002; Berenguer, 2007). WTP is higher for exotic species (e.g., Baral et al., 2007; Becker et al., 2010; Belaire et al, 2015; Lee et al., 2010; Wenni et al. 2011). Another factor is knowledge: Aytülkasapoğlu and Ecevit (2002) demonstrated that it is a significant explanatory variable for pro-environmental behavior. Thus, measuring the monetary impact of providing information may be desirable, from both the social and economic points of view. However, not much research has been devoted to countries that face a common conservation issue, especially with respect to mutual knowledge about efforts in the other country. Recently, Vogdrup-Schmidt et al. (2019) conducted an experiment in three countries where subjects (university students) were asked to make donations to protect the natural habitat of a migratory bird (Montagu's Harrier), while manipulating the information about the donations made in other countries. They found significant differences in contribution patterns between countries.

In cases where the beneficiaries and the conservation providers are in different countries, the question arises of whether it matters to the beneficiaries if the country of provision is the same country or a different one. For example, people could be concerned about conservation efforts being outside their control (Lim, 2016). Studies have sought insight into such cases (e.g., Valasiuk et al., 2017). However, they have lacked welfare measures based on spatial location.

The objective of this study is to shed light on the following empirical research questions: Does the Willingness-to-pay for species conservation depend on information regarding efforts being made in the other location (country)? If it does, does it increase or decrease because of this

information? Will people contribute more or less money if they know that conservation efforts that benefit their country efforts are being made, or not, at the second country? The relevant literature is certainly not inclusive about the conclusions to this issue (e.g., see opposing views in Fehr and Fischbacher, 2003; Frey and Meier, 2004; Fischbacher and Gachter, 2010) and as such more case studies that address the results and possible explanations are important pieces that may help solve this puzzle.

To address this issue empirically, we study the willingness to conserve efforts for the white stork (*Ciconia ciconia*) in Poland and Israel. A white stork was selected from among various migratory bird species. It is a species well recognized not only in Poland and Israel and protective activities for this species are carried out in many countries. Because migrant species depend on conservation efforts in both countries, understanding how governments can help through individuals preferences can help not only to protect the species but also to conserve stable ecosystems (Berthold et al., 2004; Flack et al., 2016).

We designed a contingent valuation (CV) study that focused on WTP under different information conditions, with some respondents having information on efforts in the other country, and others not having that information. The study used a discrete choice question followed by a payment card question to ensure robustness of the estimates (Myers et al., 2010). Unlike many studies (e.g., Haefele et al., 2018), our study was not concerned with income differences and their impact on WTP. Other studies were concerned with the effect of distance on WTP (e.g., Nielsen et al., 2016) but were not concerned with national borders. Yet another research avenue was concerned with nationality effects (e.g., Dallimer et al., 2014). However, none of the studies tested information about mutual effort. Knowledge about the effect of this information could be

used in the design of effective policy measures at the international level. This is one of the potential contributions of the present study.

Our research hypotheses are the following:

Hypothesis 1: The probability that a respondent will agree to a certain bid is negatively correlated with the amount of the bid.

Hypothesis 2: The average WTP with and without information about the other country's conservation efforts will be different. This can be further divided into two sub-hypotheses:

> Hypothesis 2a (Matching behavior): The average WTP will be higher with information about the other country's conservation efforts.
>
> Hypothesis 2b (Free riding behavior): The average WTP will be lower with information about the other country's conservation efforts.

The paper continues as follows. Section 2 describes the study areas in both countries as well as the survey design and data collection. Section 3 summarizes the results with descriptive statistics and econometric analysis. Section 4 discusses the results considering the research hypotheses and previous literature. Section 5 summarizes the study and includes suggestions for further research.

2. Materials and Methods

2.1 The Good being valued

Activities for the protection of white stork are taken in many countries. He is a species protected under Convention on the Conservation of Migratory Species of Wild Animals (CMS) and

Ramsar Convention on Wetlands. The white stork is also listed as threatened with extinction in Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (bird directive) and is the subject of protection (protected) in the European Union in the NATURA 2000 network.

The significance of the white stork stems also from the fact that it is a species that directly reacts to changes in the environment and is a species indicator of environmental changes (Johst et al., 2001) especially a good biodiversity indicator (Yavuz et al., 2012; Tobolka et al. , 2012). White stork is also an umbrella species (Tobolka et al., 2012, Kronenberget al., 2017). Protecting its feeding grounds and nesting sites, many rare species of plants and animals are protected.

The white stork inhabits the whole of Poland, with the exception of mountain ranges and larger, dense forest complexes. However, the distribution of stork nests is uneven. The northeastern part of the country is inhabited very densely, in contrast with the less dense southwest. The Vistula Valley is a clear border between these two parts of Poland. The northeastern part of Poland is also home to the largest concentration of white storks in Europe. White storks' nest in the vicinity of human settlements, in agricultural areas near rivers and wetlands (Kroneneberg and Giergiczny, 2014). The white stork arrives in Poland at the turn of March into April and starts breeding at the end of April. After the end of the breeding cycle, storks fly south, out of Poland, at the end of August or the beginning of September. This species lives in Poland for about five months. Besides their cultural importance as a national bird in Poland, storks also have economic value, as they contribute to tourism. The attention of tourists and birdwatchers is particularly attracted to “stork villages”, where in a small area there are many stork nests. Most such colonies are in northeastern and eastern Poland. For example, the stork village of Żywkowo is visited by

2000–5000 people per year (Czajkowski et al., 2014), and the village of Kłopot by about 1000 tourists and birdwatchers (Kronenberg and Giergiczny, 2014).

During the winter about 500,000 white storks pass through Israel on their way to Africa. Some of them stay for the winter in Israel (Leshem and Yom Tov, 1996). The white stork eats a wide range of animal prey, including insects, fish, amphibians, reptiles, small mammals and small birds. It takes most of its food from the ground, in low vegetation, and from shallow water (Dallinga and Schoenmakers, 1987). The major threat to storks in Israel is changes and reduction of habitat, especially wetlands. Water use and river water flow reduction are another source of threat for feeding storks. Hunting and infrastructure (e.g., electrical lines) may also pose a risk for that population. Finally, storks are sensitive to pesticide use, especially if applied at high concentrations to fight an unexpected nuisance, such as locusts (Shamoun-Baranes et al., 2003). Storks are listed as Vulnerable (VU) in Israel, while they are listed as Least Concern (LC) in Europe. The main conservation efforts in Israel are the creation of secure nesting platforms on high-voltage poles. In addition, nature conservation rangers try to prevent storks from landing in dangerous sites, such as industrial wastewater ponds.

In Poland, as in Israel, the main threat to the white stork is the decrease in the area of feeding grounds. Another threat is the poor condition of existing breeding sites and the lack of places to set up new nests as a result of changing roofing materials and cutting old, withered trees. Storks build their nests on active power poles, and are at risk of dying from electrocution (Dolata, 2006).

The protective activities of the white stork in Poland consist mainly of the renovation of nests in autumn and winter. In addition, trainings for energy workers are organized to secure nests on

active power poles. In wetlands, restoration efforts are carried out to secure habitats for storks, e.g. creating ponds (Dolata, 2006).

2.2 The valuation methodology

The economic benefits of non-market goods such as birds and other wildlife species and their habitats can be measured by either revealed or stated preferences methods. In revealed-preference methods, actual individual behavior is observed to assess the value of the good. This is useful when the value of the good is largely based on use, such as in tourism or other recreational activity at the site itself. But often most of the value is not associated with use. It may include bequest value (ensuring that the species will be protected for the benefit of future generations) or existence value (the knowledge that the species will continue to survive). In such cases, stated-preference methods should be used. These methods rely on individuals' statement of their own WTP for the survival of the given species.

In the case of birds, a frequently used revealed preference method is the Travel Cost (TC): one estimates the value of the species by considering the distance of visitors from a birdwatching site and their frequency of visits. However, in the case of the white stork the total value will be seriously underestimated if only use value is considered. Therefore, we used a stated preference method in this study. CV is one stated-preference method that is used in many studies to estimate WTP for non-market goods such as different species and their habitat. The word *contingent* is used as WTP estimates are contingent on a description of a hypothetical change and how much people are willing to pay for it (in the case of improvement) or to prevent it (in the case of worsening). A full description of the CV methodology may be found in Bateman et al. (2002), for example.

We describe these elements in the next section. Two approaches were used to estimate WTP: dichotomous choice (DC) and payment card (PC). Each has its own merits. DC is simpler to understand and was most recommended by the expert panel on CV (Arrow et al., 1993). Our analysis did not use an open-ended version which is almost not in use any more and did not use the choice modelling approach. The reason for not using the latter is that we are interested in the value of the resource itself, which is the stroke. Since the choice modelling relates to different attributes of the resource, it is of less interest in this case.

Here sub-samples of survey participants are given a bid and have to provide a yes-or-no answer. The DC responses are analyzed using logistic regression, where the probability of a yes answer is (Loomis et al., 2000; Greene, 2003):

(1) $\Pr(\text{Yes}) = 1 - [1 + \exp(\beta_0 X - \beta_1 Bid)]^{-1}$,

where β_0 is the vector of regression coefficients on the independent variables X, and β_1 is the regression coefficient on the bid amount. Using the distribution function of saying yes, one can estimate the mean WTP for the relevant population as (Hanemann, 1989):

(2) $\text{mean WTP} = \frac{1}{\beta_1} \ln [1 + \exp(\beta_0 X)]$

Despite its popularity, the DC method does not provide much information on the true WTP of the individual, but only whether he/she is willing to pay a specified amount.

We therefore also used the PC option. This method uses a card which lists a range of monetary amounts, from which respondents select the one that represents their maximum WTP. This format is more statistically efficient than an open question about WTP as the monetary value provides a more precise estimate of the respondent's WTP and avoids the issues related to other

WTP question formats. For example, individuals find it hard to report their WTP for goods with which they are not familiar. The PC included a zero option for those who were unwilling to pay anything. These responses were later split between legitimate zero responses (those who answered either that they did not have enough income for that purpose or that it was not on their priority list) and protest bids (respondents who said that it was not their role to pay).

The PC responses were analyzed using tobit regression, which is suitable for cases with many observations with zero bids, which was the case here:

(3) WTP $= X'\beta + \varepsilon$,

Where WTP = 0 also for underlying negative values of WTP. In many cases, this is the result of censoring: what we observe is only a part of the distribution, and negative values are massed at zero. Estimation of WTP with ordinary least squares will yield biased and inconsistent estimates (Halstead, Lindsay and Brown, 1991). Tobit estimation will provide unbiased and consistent parameter estimates. The mean WTP is calculated as (Greene, 2003):

(4) mean WTP = $\Phi\left(\frac{X'\beta}{\sigma}\right)(X'\beta + \sigma\lambda)$,

Where Φ is the normal cumulative distribution function, σ is the standard deviation and λ is the inverse Mills ratio.

2.3 Survey design

CV studies make use of a questionnaire that includes the following elements: description of the good that is to be valued; description of the scenario for which the payment will be used; the

payment vehicle by which individuals would pay; and the way the responses will be used to decide whether the payment will be collected.

Our questionnaire had four sections. The first section introduced the respondent to the issue of storks, including a short general overview of their yearly life cycle, risks they are exposed to, and efforts that can be made for their conservation. The main elements of the program that were mentioned were the protection of stork nests and wetlands. The presented activities mainly involved lifting and placing nests on top of power poles on platforms; construction of artificial nests in the cases where nests threaten to damage buildings; and, for nests in trees, removing branches that made landing in the nest difficult. In Poland, the presented wetlands protection consisted of buying and restoring them.

There were six versions of the questionnaire, created by combining three different bids and two information statuses: with and without knowledge of conservation efforts in the other country. We assigned the different versions randomly to respondents. Half of the respondents did not receive any information about conservation efforts in the other country, but their version of the questionnaire did mention that this is an issue concerning both countries. The other half did receive information about the efforts in the other country. For example, the Israeli version of the questionnaire stated, "In Poland there is a substantial willingness to conserve this species and as a result for example, several areas were declared as safe zones for Storks and designated 'Stork Villages'".

The second part of the questionnaire consisted of attitude questions regarding the importance of general environmental, conservation and bird issues. The first four attitude questions were on a 1 (do not agree at all) to 5 (Agree very much) Likert scale, with 3 being "indifferent". An example

of an item is "I care about the environment". The next seven items were yes/no statements, e.g. "It is not my duty to fund stork conservation". The third section was devoted to WTP questions. It started with a paragraph explaining the importance of thinking about budget constraints and on the other hand emphasizing that if no one is willing to pay for conservation efforts, the government will not fund them, either. We made sure that people knew that the government will seriously consider the results of this study. We then asked, "Based on examples of the conservation efforts and the risk involved presented to you, will you be willing to pay (ILS/PLN) 100/300/500 (EUR 24/72/120) to fund such efforts?" Finally, we asked respondents the most they would be willing to pay from a PC; answers ranged from ILS/PLN 0 to 1000 (EUR 240) in ILS/PLN 50 (EUR 12) steps. These amounts were chosen based on focus groups we held before assembling the final version of the questionnaire[2].

To minimize protest bids, we characterized the payment as a donation, not a tax (Boyle, 2017). Another reason for not calling it a tax is that the two countries have different tax systems, and we wanted to neutralize the effect of this difference (Shah et al., 2016). Following the NOAA Panel on CV, to be conservative, we kept all the zero WTP responses, whether they were valid zero bids or not (protest bids. Arrow et al., 1993). We also checked that none of the hypothesis tests would be changed if we removed the protest bids. Indeed, in no case did the results change.

After respondents indicated their WTP in both approaches, we asked them about their motivations. There were seven motivations listed: Three were listed for respondents who indicated a zero WTP. Two out of the three were "legitimate" answers. One was inability to pay

[2] We held two focus groups in each country with a mean number of 11 participants. The respondents received the original version of the survey after a preliminary survey in which they had to pay by an open bid question. The group meeting was held in the evening hours and took about 2 hours on average including a fair amount of time devoted to focusing us in many aspects. Participants were groups of retired teachers, employees of a consulting firm, graduate students and members of a small rural community.

while the other was lack of interest. A third motive for unwillingness to pay was a statement that "it is not my responsibility to pay for such a program". This was considered a protest bid. The other four motives were listed in order to account for the four value types: Use, option, bequest and existence.

The last section of the survey was devoted to the socio-demographic characteristics of the respondents. Here we asked about gender (female or male), age, persons per household, income (1–4 and 1–5 scales for Israel and Poland, respectively) and education (1–5 in Israel, 1–3 in Poland).

2.4 Data collection

The target population for our study was all residents in Israel and Poland. This is dictated by the public-good nature of the storks, and the fact that they can be seen widely in both countries.

In Israel, the questionnaires were administered in a face-to-face mode during six weekdays during July and August 2018 in train stations and on a train line that crosses the country from north to south. This helped ensure that the sample included people from different locations and of different ages, occupations, income levels and ethnicities. Participants were given paper copies of the questionnaire. An average of 5.5 hours was spent each day by two research assistants. The average time to fill the survey was 16.5 minutes per respondent. The survey was completed with the research assistant standing nearby to answer any questions the respondent may had.

In Poland, the questionnaires were conducted from July 7th to September 10th 2018. Questionnaires were been handing out in weekdays, usually from 10 am to 6 pm.. The research

was conducted in all 16 provinces (voivodships) of Poland. In each province, the number of respondents was proportional to the number of people living there. Some questionnaires were administered on the streets of cities, towns and villages; others were administered at bus and railway stations and on trains, where people have more time to talk. Thanks to this, the respondents were from all regions of Poland and from various social groups. As in Israel, the respondents received a paper copy of the questionnaire.

3. Results

The survey resulted in a sample size of n = 438 in Poland and n = 248 in Israel. The following subsections describe the data and then use them to infer the willingness to pay for stork conservation and the factors affecting it.

3.1 Descriptive statistics

Attitudes and socio-demographic variables. The mean and 95% confidence intervals in each country of the environmental and stork conservation statements in the survey are plotted in Figure 1. When considering results in both countries, we found (in Figure 1) that a high value is given to environmental issues in both countries. Respondents in both countries did not express a strong interest in migratory birds, but did express a higher interest level in animals in general. The biggest difference between the two countries was in the level of anticipated disappointment if the storks were to stop visiting the respondent's country. Polish respondents would be more disappointed on average than would Israeli respondents by 20% (p-value < 0.05).

The rates of "yes" answers in each country to different WTP motivations are plotted in Figure 2. A higher percentage of respondents stated the following motives in the Israeli sample, relative to

the Polish sample: existence value (15% more) and option value (11% more). In the Polish sample, a higher proportion of the sample stated use value (35% more than the Israeli sample) and bequest value (7% more). All of the differences are significant at the 95% level. The rate of those that stated unimportance is 8% higher in the Israeli sample, while inability to pay was 10% higher in the Polish survey respondents. Both legitimate zero WTP motives differences are significant at the 95% level. Protest bids averaged 22% between the two samples and the difference is not significant at the 95% level.

Figures 1 and 2 about here

Table 3.1 about here

The means of the socio-demographic variables of the sample in each country are compared in Table 3.1. Socio-demographic characteristics differences are all significant at the 95% level, except number of family members (mean value of 3.28 for both samples). The Israeli sample has a 26% higher proportion of women compared to the Polish sample. The mean age in the Polish sample was 8 years higher than that in the Israeli sample. Education level was relatively higher in the Polish sample, 2.49/3, vs. 1.88/5 in the Israeli sample. Income was also higher for the average Polish respondent by 0.56 (out of 5).

Willingness-to-pay variables. We start from the DC results and then move to the PC. Percentages of "yes" answers to the valuation question are given in Table 3.2.

Table 3.2 about here

The share of respondents stating that they were willing to pay the sum presented in the question declines as the bid increases in both the Israeli and Polish populations. This is the rational trend,

and it conforms to theory. All the mean differences in Israel are significant per the one-tailed *t*-test (0.0497, 0.273 and 0.169 for the 100, 300 and 500 versions, respectively).

Table 3.3 presents descriptive statistics concerning the PC.

Table 3.3 about here

On average, Israelis were willing to pay PLN 165 (EUR 39.6), compared to PLN 117 (EUR 27.2) for the Polish, a ratio of 1.41 to 1. In Israel, people who received information about Poland were willing to pay more, on average. In Poland, people who received information about Israel were willing to pay less on average, but the difference is not significant. In Israel those who received information about Poland were willing to pay on average 29% more than those who did not receive the information ($p<0.01$).

Econometric analysis

We analyzed the relationship between attitudes and socio-demographic variables and the probability of saying yes in the DC model and WTP in the PC model.

The DC was analyzed in a logit-type regression, where the dependent variable was the answer to the bid and explanatory variables were the attitude and socio-demographic variables, along with the bid amount and a dummy for knowledge of cooperation. Results are given in Table 3.4. In both regressions, increasing the bid decreased the probability of accepting it. In Israel, general environmental attitude had a positive effect on the probability of accepting the bid. In Poland, interest in animals and the disappointment from not seeing storks had a significant positive effect on the probability of accepting the bid, as well as income. Information about the cooperation in conservation has a positive effect only in the Israeli sample.

Table 3.4 about here

The PC regression is a tobit type with the chosen sum as the dependent variable, to accommodate the large number of zeros. Results are given in Table 3.5. The regression includes the same explanatory variables as the DC model (without the bid amount). Results are similar to those from the logit regressions. Age was found to have a negative effect on willingness to pay in both countries.

Table 3.5 about here

4. Discussion

Overall, our results suggest that the independent variables are related to the explanatory variables in a logical way from the economic perspective. Income, for example, is supposed to affect WTP and the probability of saying yes. This was indeed usually the case, except in Israel in the DC model. This is consistent with other studies that estimated the effect of income on both environmental behavior and WTP (e.g., Jin et al., 2008; Pisano and Lubell, 2017). The variable *Cooperation* means knowledge that the other side is cooperating. As in the descriptive statistics and the *t*-test results, we also observe in both the DC and PC models that in Israel the variable is significant, with the expected positive sign, although in Poland it is negative but not significant. Interestingly, education doesn't seem to be a significant explanatory factor in both countries and both models. But age is significant. The sign of the correlation is negative, indicating that on average young people are willing to pay more (or more likely to say yes to a given bid). Effects of number of people per household and gender are not conclusive between models and countries.

With respect to gender, this is in some contrast with Chan et al. (2017), who found statistical differences in WTP between genders.

We tested four attitudes as explanatory variables. The first, "interest in migratory birds", is a statement about care for birds in general and in particular migratory birds. The second, "interest in animals in general", is more general than the first. The third, "environmental topics are important to me", is the most general. The fourth, "disappointment if storks stop visiting my country", is the most narrow and focused.

In Israel, only the most general statement about environmental issues was significant in both models. However, it was not significant in either model in Poland. The fourth, narrowest statement was significant in both models in Poland and one model (the tobit) in Israel. The first two statements, about birds and animals in general, were not significant. Animal care was significant in Poland in the two models, and care for birds was significant only in one model (the tobit).

WTP (based on Hanemann, 1989) in the DC model was ILS 137 (EUR 32.9) and ILS 180 (EUR 43.2) for those who did not get the information about the other country's effort and those who did, respectively. For Poland, overall WTP was PLN 112 (EUR 26.1), and it was the same for those who received the information and those who did not. In Israel, WTP for the PC was ILS 147 (EUR 35.3) and ILS 189 (EUR 44.6) for those who did not get the information and those who did, respectively. In Poland it was PLN 117 (EUR 27.2) for both groups. The greater WTP obtained in the PC model is consistent with rational behavior, as a yes answer to a DC bid establishes a lower bound for individual WTP. The estimates obtained in this study are comparable to those previously found in the meta-analyses of annual WTP for birds and other

species (Richardson and Loomis, 2009; Lindhjem and Tuan, 2012). In Richardson and Loomis (2009), WTP for the conservation of whooping cranes was found to be in the range of USD 43-68, which is equivalent to EUR 47-75. Our estimates are lower, which is not surprising given the differences in income per capita between the US, Poland and Israel. More recently, Lundhede et al. (2014) found that the average WTP for birds with stable population in Denmark is between EUR 70-93.

Although this research concerns only one species of migratory bird (the white stork) and only two countries (Israel and Poland), part of the results permit general conclusions regarding the impact of information on the propensity to support specific protective measures. This is especially important when we want to gain support for planned activities and international cooperation initiatives.

We find a negative correlation between yes responses and bid size. The correlation is statistically significant for both countries. These results testify to a rational approach to the protection of white storks among respondents. The protected good has a different individual utility for them, so the probability that they will agree to a certain amount is negatively correlated with its value (Zander et al., 2014).

Noteworthy are the results regarding the impact on WTP of information about efforts being made in the other country. In Israel, respondents given information on the high involvement of Poles in the protection of this species were more likely to say yes, and their quantitative WTP was higher. This suggests a relatively large role for altruistic motives among the inhabitants of Israel and openness to international cooperation.

In Poland, this information turned out to be statistically irrelevant. Several factors influenced these results. It could be that the information has two effects among the respondents, both an altruistic effect and a free-rider effect, which work in opposite directions, the combined result being an insignificant effect on behavior. Another possibility is that Poles are cautious, because of their inability to control the effects of protective measures taken in another country, as pointed out by Lim (2006). Clarification of this issue may require further research in the context of the effectiveness of actions undertaken at the international level. These result are similar to those obtained by Vogdrup-Schmidt et al. (2019) in Ghana and Denmark (similar to Israel here) and in Spain (similar to Poland here). In our study, the more heterogeneous samples in each country provided more information about the differences in views and attitudes that lead to different WTP.

If the public does not have confidence in international cooperation, it is necessary to take actions that show the benefits resulting from actions taken by the other party and ensure that there is a possibility of mutual control over the protective measures taken and the results obtained. If the free-rider tendency plays the main role, it seems advisable to inform people that the involvement of only one country will bring much less effect (Kukkala and Moilanen, 2017). Similarly, when countries conduct activities to protect a given species independently of each other, their effects will be smaller than if they acted jointly. International cooperation in the field of wildlife protection permits synergy effects. Another factor that could explain the existing situation is the cultural and historical importance of the white stork for Polish people (Dolata, 2006). Storks are already so important to them that information about other countries' conservation efforts does not significantly affect their WTP. The relatively great importance of storks to the Poles is also evident in the answers to the questionnaire, with a significantly higher

share of respondents in Poland expressing a desire to see storks and to ensure their existence for future generations (Table 3.1). It could also be that in the cases where the information about the conservation efforts in Israel resulted in lower WTP among Poles (Table 3.2), this was a form of resistance to "sharing" a national symbol with another country. Jacobsen et al. (2008) refer to species that have special significance as "iconized" species, and argue that using such species in valuation studies could lead to high valuations. In our study, storks are probably iconized in Poland. The implication is that valuation for them is relatively high, regardless of other information provided, which is in line with our results.

In both countries, the main variable influencing the tendency to support protective activities is age. Young people are more likely to say yes and are willing to pay more for conservation. This may be because they are more aware of environmental threats, see a greater need to take such action, or are more open to new proposals. The results are consistent with earlier studies showing a greater tendency of young people to bear the costs of protecting environmental resources (Manteuffel et al., 2005; Lagerkvist and Hess, 2011; Zander et al., 2014).

In both countries, there was no significant effect of respondents' educational level on WTP. This replicates the findings of Pisano and Lubell (2017) regarding the impact of education on private environmental behavior.

Finally, we consider the four attitudes that have been included as explanatory variables. In Poland, the effect on WTP of disappointment if storks stop visiting the country is much larger than in Israel (Tables 3.4 and 3.5). The white stork is one of the national symbols in Poland that is particularly respected. For centuries, it has been treated as bringing good luck, and protecting the house from evil. In Polish tradition, the stork teaches faithfulness and is a symbol of fertility.

Its importance is reflected in literature and art (Leończuk, 1999). In Israel, in contrast, the factor influencing yes responses and support for protective activities is the importance of environmental protection. The stork does not play such a significant historical and cultural role here as it does in Poland, which may explain the difference between those countries.

5. Summary and conclusions

Using a stated-preferences survey of a representative sample in Israel and Poland we estimated the WTP of both populations to conserve an endangered species, the white stork. This was done with both DC and PC analysis. A large group of respondents in both countries expressed their willingness to support the protection of the white stork. WTP in both countries was negatively correlated with bid size and age. In Israel, information about costs incurred for protection by people in Poland had a significant positive impact on WTP. In respondents from Poland, this relationship was not seen. This demonstrates the need to explain to people the need to cooperate in the protection of environmental goods, because these goods do not recognize borders.

Such studies are limited by the nature of the resource being valued. It may be that other species may reveal different behavior venue. This, in turn, requires additional research to correlate species type to behavior type. This study as others can be a parts containing the basis for such future study.

These findings have important implications for international cooperation, especially in regard to communication of information about mutual efforts. One of the obstacles to cooperation in providing a public good is the rules regarding the cooperation of other parties, which might affect one's decision whether to cooperate or not. Thus, regulatory agencies should consider these results when conducting local cost–benefit analyses.

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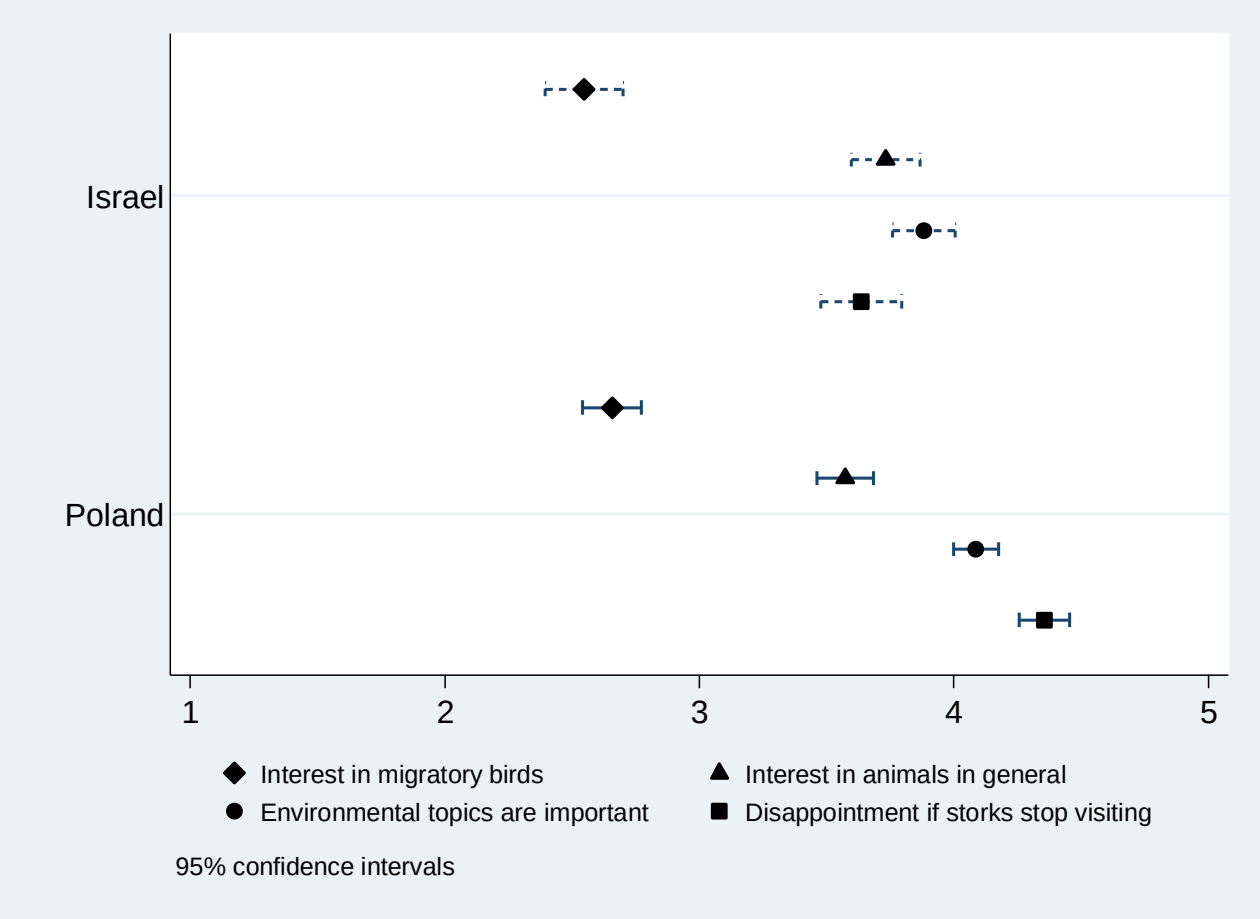

Figure 1: Environmental attitudes measured on a 1-5 Likert scale

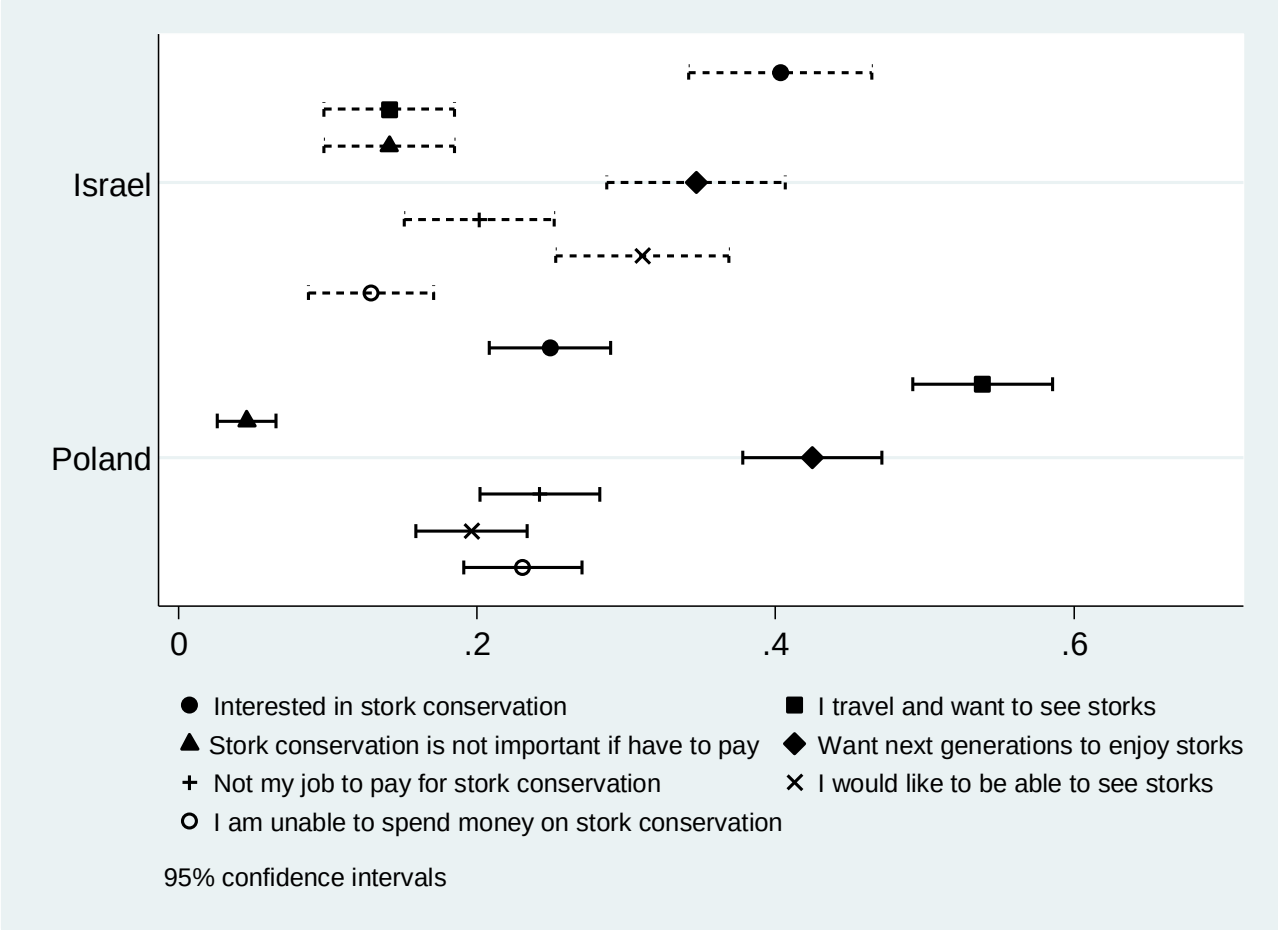

Figure 2: Proportion of sample that answered "yes" to stork WTP motivation statements

Table 3.1: Descriptive statistics of socio-demographic variables

Country	**Israel (*n* = 248)**		**Poland (*n* = 438)**		***t*-test for difference in means between countries**
	Mean (95% C.I)	**S.D.**	**Mean (95% C.I)**	**S.D.**	
Gender (female = 1)	0.64 (± 0.06)	0.48	0.38 (± 0.05)	0.49	6.56***
Age (years)	32.76 (± 1.62)	13.22	40.82 (± 1.36)	14.48	–7.05***
Number of family members	3.20 (± 0.24)	2.06	3.36 (± 0.07)	1.79	–0.98
Education: (1–5) in Israel (1–3) in Poland	1.88 (± 0.12)	0.97	2.49 (± 0.06)	0.59	–10.04***
Income (1–5)	2.63 (± 0.15)	1.23	3.19 (± 0.12)	1.33	–5.28***

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 3.2: Percentage of yes answers by country and by bid

	Israel		Poland	
	Price (ILS)	% saying yes	Price (PLN)	% saying yes
(1) All	100	59.56	100	40.1
(2) No information	100	52.0	100	36.7
(3) With information	100	69.23	100	44.1
Significance of difference (3 – 2)		0.051*		0.18
(4) All	300	22.4	300	21.4
(5) No information	300	20.0	300	27.8
(6) With information	300	25.0	300	14.7
Significance of difference (6 – 5)		0.29		0.03**
(7) All	500	17.6	500	15.2
(8) No information	500	13.6	500	16.7
(9) With information	500	23.3	500	13.9
Significance of difference (9 – 8)		0.14		0.32

*$p < 0.1$, **$p < 0.05$.

Table 3.3: Payment card descriptive statistics

	Israel (ILS)		Poland (PLN)		*t*-test for difference in means
	Mean	S.D.	Mean	S.D.	
(1) Overall sample	165.4	12.8	117.2	7.2	3.54***
(2) Without information	146.6	15.7	118.4	10.1	1.58
(3) With information	188.8	20.9	116.0	10.4	3.49***
Significance of difference (3 – 2)	0.05**		0.43		

***$p < 0.01$, **$p < 0.05$

Table 3.4: Logit regression output for the DC survey

	Israel		Poland	
Variable	Coefficient	S.E.	Coefficient	S.E.
Interest in migratory birds	–0.020	0.193	0.128	0.130
Interest in animals in general	0.158	0.221	0.330**	0.148
Environmental topics are important to me	0.653***	0.236	–0.136	0.180
Disappointment if storks stop visiting my country	0.133	0.191	0.837***	0.201
Gender	0.115	0.362	0.142	0.264
Age	–0.028*	0.0172	–0.031***	0.0100
People per household	–0.020	0.092	0.124*	0.0738
Education	0.181	0.203	0.003	0.249
Income	0.228	0.175	0.352***	0.111
Cooperation	0.256**	0.159	–0.162	0.247
Bid	–0.006***	0.001	–0.004***	0.001
Constant	–0.824882**	1.129	–0.44807***	1.309
	Number of obs. = 194		Number of obs. = 438	
	LR $chi^2(11) = 49.46$		LR $chi^2(13) = 86.82$	
	Prob > $chi^2 = 0.0000$		Prob > $chi^2 = 0.0000$	
	Log-likelihood = –102.68437		Log-likelihood = –205.603	
	Pseudo-$R^2 = 0.1941$		Pseudo-$R^2 = 0.1743$	

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 3.5: Tobit regression output for the PC survey

	Israel		Poland	
Variable	Coefficient	S.E.	Coefficient	S.E.
Interest in migratory birds	6.496	17.633	27.025***	8.884
Interest in animals in general	10.153	19.056	17.232**	9.768
Environmental topics are important to me	48.066**	19.420	–6.783	11.937
Disappointment if storks stop visiting my country	34.05**	16.203	68.006***	10.614
Gender	57.001**	33.528	7.802	17.912
Age	–2.727***	1.528	–3.192***	.646
People per household	–7.857	8.426	6.760	4.956
Education	5.364	19.436	–20.425	16.252
Income	26.891*	16.021	29.395***	7.130
Cooperation	19.696***	.193	–5.027	16.796
Constant	235.049***	96.088	115.332***	72.208
	Number of obs. = 238		Number of obs. = 438	
	LR $chi^2(10)$ = 29.34		LR $chi^2(12)$ = 121.32	
	Prob > chi^2 = 0.0011		Prob > chi^2 = 0.0000	
	Log-likelihood = –1056.7218		Log-likelihood = –2193.1333	
	Pseudo-R^2 = 0.137		Pseudo-R^2 = 0.0269	

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$