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WILLINGNESS TO PAY FOR AN ENVIRONMENTAL GOOD IN CHILE - CONCEPT AND APPLICATION

by

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Abstract

In Chile, since the promulgation of the Environmental Baseline Law in 1994, a new era for the application of the environmental valuation methods as an instrument to evaluate the environmental impacts of economical activities and governmental policies has begun. This modern view of combining environmental and economic aspects is challenging for economists. In our study we review the Contingent Valuation (CV) procedure at the background of Chile's situation and apply the concept empirically by a Willingness to Pay (WTP) study for an emerging environmental problem in rural areas. Finally, we discuss the possibility to apply such studies at a more general level by benefit transfer.

Keywords: Willingness to Pay, Compensation Variation, Contingent valuation, Environmental Policy, Benefit Transfer, Chile

JEL Codes: N56 - Latin America; Caribbean
Q3 - Nonrenewable Resources and Conservation
Q26 - Contingent Valuation Methods
Q38 - Government Policy

1. Introduction

Economic analysis is becoming increasingly important as a planning and evaluation method in environmental assessment. The economic approach offers a logical means of integrating applied science and public decision-making, of reducing conflicts in environmental and natural resource management, and of reaching balanced decisions on development and environmental protection. With recent advances in valuation methods, it has now become possible to place economic values on many environmental impacts and incorporate them in benefit-cost appraisals. In these contexts, the chilean environmental legislation offers a good possibility to incorporate evaluation methods in environmental assessment.

The main objectives of the study are: a) To discuss the prospects and potential role of Contingent Valuation (CV) method as a decision-support tool in the contexts of the Chilean Environmental Policy. b) To apply the concept empirically by a Willingness to Pay (WTP) study for an emerging environmental problem in a rural area. c) To discuss the possibility to apply such studies at a more general level by benefit transfer. d) To provide further guidelines for proper use and application.

The study reported in this paper has been applied to evaluate the implementation of an environmental protection fund in two rural communities, *San Pedro* and *Isla de Maipo*. Data were collected from 382 households with the objective to undertake a WTP-study. With some simple regression techniques the WTP values are estimated and the results indicate that the determinants age, education, and income significantly effect WTP. Furthermore the data are used in the framework of a benefit transfer analysis. The results are promising in the sense that - under the assumption of the model - the benefit function is robust at the mean. Finally we conclude with some policy recommendations and indicate to further research areas.

This investigation is the first study developed in Chile using the CV method with the empirical application of the Benefit Transfer as a methodological tool for the environmental management.

2. Environmental Policy in Chile - Challenges, CV and Prospects

2.1. Legislative Context

Chile's economic development has been based historically on the extraction and utilization of renewable and nonrenewable resources with partly disastrous consequences for the environment, preventing a long-term sustainable development. Conscious of this situation, authorities are committed to protect the environment and the quality of life but at the same time pursuing the political goal of economical development, which is important to increase people's welfare. Thus, economic development has to be based on the sustainable use of natural resources.

Since 1990, the government has drafted a number of long-term policies and enacted legislation: The general regulatory framework for environmental control is contained in the 1994 Environmental Baseline Law, which created the National Environmental Commission (CONAMA), presided by a council composed of 13 ministers. The law includes environmental consideration in national development, establishes criteria for regulating procedures to monitor the environmental impact of public and private investment projects, and provides mechanisms for citizen participation. One such tool is the Environmental Impact Assessment System (EIAS), a prerequisite for all projects involving natural resources. In 2000, the system was used to evaluate 837 projects, primarily involving real estate and manufacturing, which altogether represented an investment of just under 5,9 billion dollars.[1]

[1] For further details see: www.conama.cl

2.2. CV in Chile and its Prospect in the Agricultural Sector

The regulation that rules the EIAS opens a possibility to the CV method: Compensation for provoked environmental damage and environmental impact studies. In both cases CV is visualized as an adequate tool to evaluate economically the environmental damages. Pioneer studies developed in Chile in the beginning of the 90' s in the field of the environmental evaluation are a great contribution to the use of these techniques. They focused principally in three areas: air quality and health, wilderness area protection, and public policies (VILLALOBOS).

Economic theory usually assumes that people make choices according to their preferences in such a way that they seek to maximize their own satisfaction or utility (HICKS). Welfare economics is based on the utilitarian principle and this is often measured in terms of people's WTP. Thus, an individual's WTP for something is used as a measure of utility that he/she derives from the entity in question and hence a measure of benefit of the entity to the individual. Welfare economics then aggregates individual's WTP measures to produce an aggregate measure of benefit for society.

The CV method has the advantage of being applicable in situations where no market data is available. It uses the survey as an instrument to measure individuals' maximum WTP for different natural resources or other public goods presented to them in a hypothetical market with a proposed improvement. In comparison with traditional attitudinal studies, the CV method has the advantage of providing a more accurate assessment of an individual's opinions, and, in addition, estimated WTP values can be incorporated into monetary based cost-benefit analyses (CUMMING et al.).

Furthermore, one important area of application is the assessment of "option values", "bequest" and "existence values", examples of so called nonuse values. An option value refers to the price that people are willing to pay to maintain the possibility of using a resource (e.g. such as a wilderness area). Existence values refer to the satisfaction people receive from the knowledge that a natural resource will be preserved. Option values and existence values are usually not expressed through market mechanisms. CV methods offer some hope of actually measuring these values. For a discussion see e.g. ARROW.

These characteristics are important, if it is considered to rural areas, just as the study zone, since this offers a conjunction of amenities, that can not be evaluated through a

conventional market, e.g. landscape bio-diversity, ecosystem functions, recreation, and cultural tradition.[2]

3. The Study [3]

3.1. Background of the Study

Data was collected in the winter of 2000 from the communities of San Pedro and Isla de Maipo. Both communities are located in the Metropolitan Region of Santiago, Chile. The majority of residents are small farmers who own cultivable land no more than 12 ha. In this zone there is a particularity, the presence of high levels of pollution provoked by the concentration of livestock pigs. These two towns produce 25% of Chile's pigs, produced by three competing enterprises. This condition has forced the population to live daily with foul odors, plague of insects, and liquid and solid waste.

Personal interviews were developed to a random sample of 382 residents over the age of 18 (Isla de Maipo: 232, San Pedro: 150). The main objective of the survey was to determinate the WTP of the respondents for an environmental protection fund as a condition to improve the environmental quality of the study area. The CV study was constructed according to the well-known guidelines established by the NOAA panel (ARROW).

The questionnaire asked about three main types of information. The first part deals with concerns about environmental problems in the study area. Some opening questions are asked to determinate the peoples knowledge about the reasons of their environmental problems. Then a hypothetical scenario is presented to them. It aims at eliciting their WTP to finance the environmental protection fund in their communities. The scenarios described to the respondents included the following governmental actions: 1) Increase of the environmental control and supervision over the producing firms 2) Improvement of the mechanisms of citizen participation, and 3) Management of an environmental protection fund between the citizens, the municipality and the pig producing firms. The vehicle of payment used in this survey is a monetary contribution. People were given the option to contribute monetarily to the environmental protection fund. If the answer was positive, the

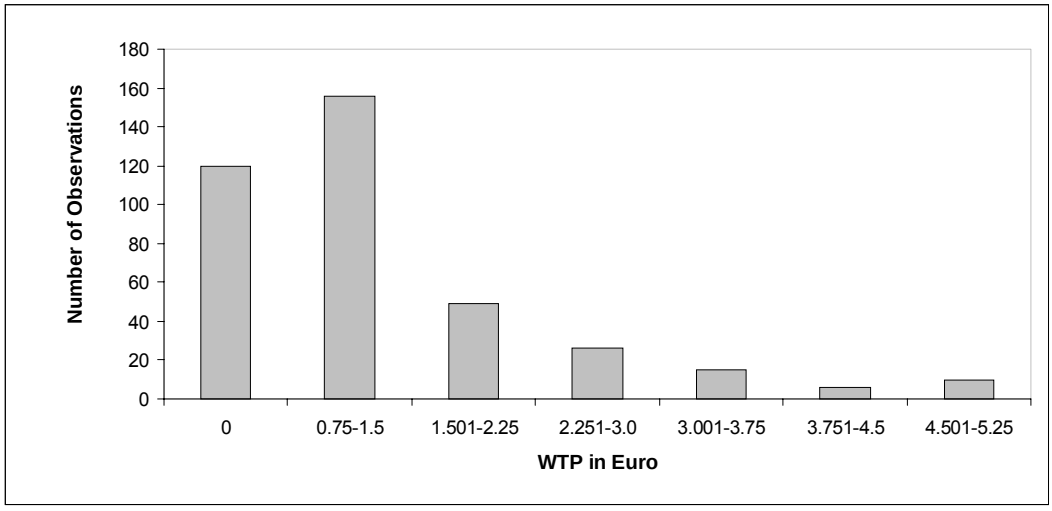
[2] For further details see for example OECD.

[3] The Study had the support of the National Environmental Commission (CONAMA) and the Municipalities of San Pedro and Isla de Maipo. These institutions furnished the the financial resource for the study.

interviewee was asked for the amount of their contribution with the *payment card* method (MITCHEL & CARSON). The last type of information asked is related to the socioeconomic variables of the respondents. Thereby education is measured in four categories (primary school, secondary school, technical education and university), and income in twelve ranges.

In order to determine the characteristics of the WTP of the population, two questions were asked: First, they were asked if they are willing to contribute to an environmental protection fund. Second, if the answer was affirmative, which would be the monthly amount for this contribution categorized in J=7 payment ranges (see fig. 1). In relation to the first question, 69% of the interviewees answered positively. That is to say, 269 people were disposed to pay a monthly contribution fund for environmental protection. People who answered negatively (120 interviewees) were asked for their reasons. 63% of these proposed that the industrialists must pay the environmental fund totally, while 17% determined the financial responsibility to the government or the municipalities.

Fig. 1: WTP for the environmental protection fund



3.2. The Model and Results

In order to analyze the WTP-distribution given in fig. 1. we specify the following model:

[1] $$\mathbf{WTP}=f(\mathbf{X},\boldsymbol{\beta})=\beta_0\mathbf{X}_0+\beta_1\mathbf{X}_1+\beta_2\mathbf{X}_2+....+\beta_K\mathbf{X}_K+\boldsymbol{\varepsilon},$$

whereby **WTP** [$WTP_n \ \forall \ n=1...N$] is a $N\times1$ vector of observations of the endogenous variable outlined in the previous paragraph, **X** [$X_{nk} \ \forall \ n=1...N$ and $k=0...K$] is a $N\times(K+1)$

matrix of observed explanatory variables, $\boldsymbol{\beta}$ [$\beta_k \ \forall \ k=0...K$] is a $(K+1)\times 1$ vector of unknown parameters and $\boldsymbol{\varepsilon}$ [$\varepsilon_n \ \forall \ n=1...N$] is a $N\times 1$ vector of unobserved error terms with

[2] $E(\boldsymbol{\varepsilon})=\mathbf{0}$ and

[3] $E(\boldsymbol{\varepsilon}\boldsymbol{\varepsilon}')=\boldsymbol{\Omega}$,

whereby E is the expectation operator and $\boldsymbol{\Omega}$ is the $N\times N$ diagonal covariance matrix, which by assumption rules out error dependencies across observations but allows for heteroscedasticity. Thus we hypothesize that the outcomes for the $j=1,...,J$ categories for $WTP_n \ \forall \ n$ can be approximately explained by a hyperplane spanned by $(K+1)$ regressors.

Since the J categories are order dependent, *ordered probit estimation* (OPE) or *ordered logit estimation* (OLE) (Greene, 2000, p. 875f), resulting in $(\hat{\boldsymbol{\beta}}_{\mathrm{OPE}}, \hat{\boldsymbol{\Omega}}_{\mathrm{OPE}})$ and $(\hat{\boldsymbol{\beta}}_{\mathrm{OLE}}, \hat{\boldsymbol{\Omega}}_{\mathrm{OLE}})$ respectively, seem to be first choices to estimate equation [1]. However, since the number of categories, $J=7$, is (comparable) large, the *Ordinary Least Squares* (OLS) is applied as a simple approximation. In the next chapter we give a critical discussion about this methodological shortcoming. However, it should be already mentioned that - for our data set - $\hat{\boldsymbol{\beta}}_{\mathrm{OPE}}$ and $\hat{\boldsymbol{\beta}}_{\mathrm{OLE}}$ did not yield noteworthy different marginal effects and inferences compared to the OLS estimates.[4]

As exogenous variables we use $X_{1n}=income_n$, $X_{2n}=age_n$, $X_{3n}=\mathrm{education}_n$, $X_{4n}=education_n*education_n$, and, as usual, a constant $X_{0n}=1 \ \forall \ n=1...N$.

Table 1 represents the regression results for the pooled observations from both villages containing $N=382$ observations.

[4] We hope by presenting the OLS parameter values the overall interpretation of our results are more easily understood: The estimated values of $\hat{\boldsymbol{\beta}}_{\mathrm{OLE}}$ and $\hat{\boldsymbol{\beta}}_{\mathrm{OPE}}$ can be interpreted only by simultaneously considering the level of X, which influence the marginal effects non-linearly, and thus, latter differ between the N observations. Conversely, $\hat{\boldsymbol{\beta}}_{\mathrm{OLS}}$ simply represent the marginal effects independent of the value of X_{nk}. The results of OPE are given in the annex.

Table 1: Results of the OLS estimation of the pooled sample (N=382) with WTP as the endogenous variable -

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.372	0.452	-0.823	0.411
Income	0.301	0.041	7.327	0.000
Age	-0.011	0.005	-2.416	0.016
Education	1.795	0.387	4.633	0.000
Education²	-0.544	0.103	-5.299	0.000
Model summary statistics:				
R²	0.270	Mean dependent variable		1.262
Adjusted. R²	0.262	S.D. dependent variable		1.382
S.E. of regression	1.187	F-statistic		34.874
Sum squared resid	531.249	Prob(F-statistic)		0.000

Source: Own Calculations; Std. Error, t-Statistic and Probability calculated by White's Heteroskedasticity-Consistent Standard Errors & Covariance method

The ordinary R^2 of 27% or adjusted R^2 of 26% presents a comparably high result for a WTP study[5] and thus may be an indication for a quite robust specification. However - for a critical evaluation of our following interpretation of the coefficients, $\hat{\boldsymbol{\beta}}_{OLS}$ - recall that nearly three quarter of the variance of **WTP** could not be explained by **X**.

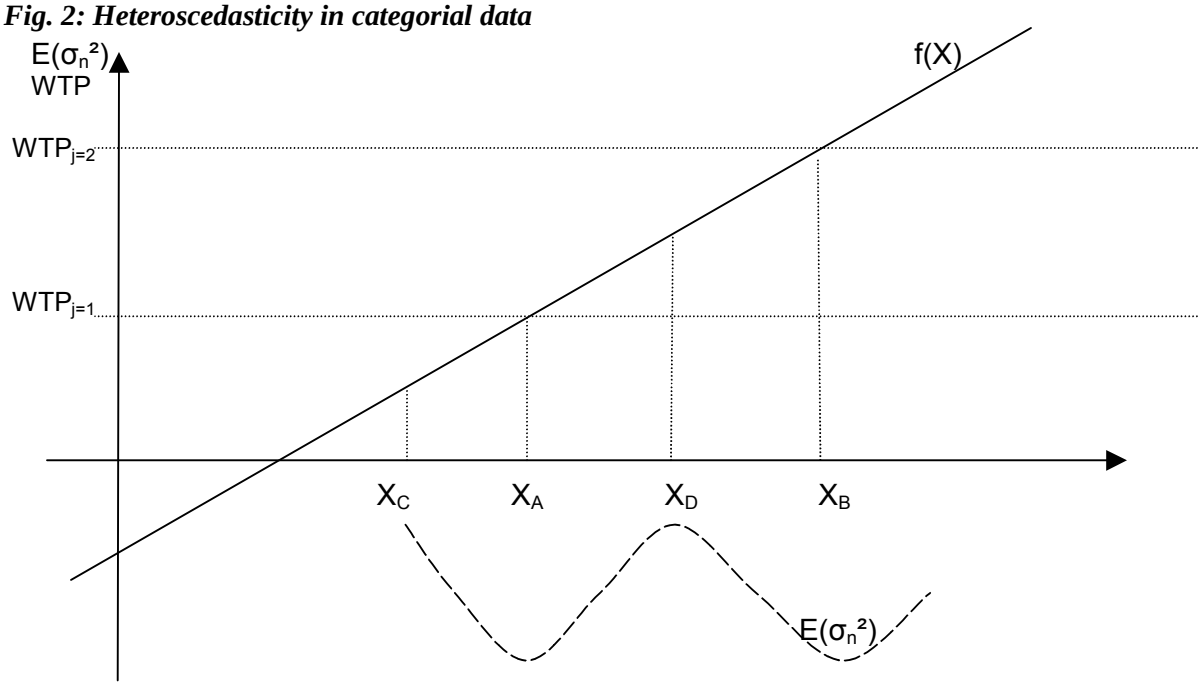
The standard errors were adjusted by heteroscedasticity because of the following reasons:

a) due to the discrete nature of the dependent variable, heteroscedasticity is introduced into the system. In order to see this, take a look at fig. 2, which illustrates that the error terms at X_A and X_B may become zero, but at all other points at the x-axis are nonzero by definition. At the values X_C and X_D the expectation of the variances of the data points, σ_C^2 and σ_D^2, are the largest, while, at the before mentioned points, $E\sigma_A^2$ and $E\sigma_B^2$ is minimal. Thus, the heteroscedasticity structure is periodic oscillating along the orthant of X. This heteroscedasticity structure is even intensified, because most of the regressors, **X**, are measured categorically as well.

[5] Concerning the R^2 of a Contingent Valuation Method GREEN & TUNSTALL remark '*...and perhaps the best that could be achieved even in the longer term for very hypothetical changes, is 20%*'.

b) In our data-set income and education create a highly nonlinear structure of heteroscedasticity, detected by *Whites Heteroskedasticity Test,* summarized in the Annex.[6]

Fig. 2: Heteroscedasticity in categorial data



As expected, income positively effects WTP. The t-statistic indicates that income is a highly significant variable in the model. This is consistent with the usual considerations in microeconomic theory, which states that relative prices matter only and utility is monotone in income. As explained in chapter 3.1 income is measured in 12 categories; thus the parameter value of 0.3 has the interpretation that, ceteris paribus, an increase in income by 46€ will result in an increase in WTP by 23 Cents.[7]

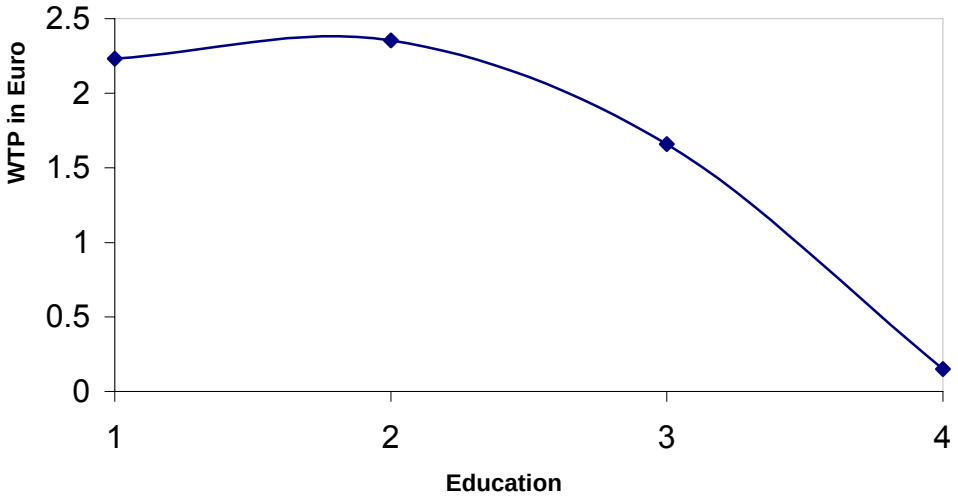
Age negatively effects the WTP. On average, a ten year older respondent diminishes the WTP by 8 Cents. In order to interpret this variable, first note that the variable *age* explains WTP in the year 2000 only. This fact does not necessarily indicate that the biological age of a person explains the WTP, but that the socio-economic and cultural background of different generations is captured in the variable *age*. Thus, we would like to interpret *age*

[6] One part of this problem may be explained by recognizing that the variance of WTP may increase in income since the proportion of the budget share spent on the environmental good usually decreases (except if it were a luxurious good which however could not be supported by our data) and makes it thus relatively more difficult for a person with a high income to estimate an appropriate share for the scenario.

as a proxy for the circumstances in which different age cohorts grew up and were educated. In particular, the awareness of environmental problems in Chile has been growing over the last decades and is now even being recognized in curricula at school as well as treated in the news which has not been the case in former decades (e.g. 60ies and 70ies). This interpretation of the variable *age* must be carefully taken into account when applying our model as a forecasting instrument: Due to the nature of the proxy, β_2 is be timevariant - which is an unusual assumption in the regression context of model [1]. Neglecting this timevariant property could lead to very erroneous interpretations in future projections.

Education appears twice in our regression model, first in its absolute value with a coefficient of $\hat{\beta}_3$=1.79, and secondly, with $\hat{\beta}_4$= -0.54, measured by its square. Considering that education is a categorical variable with values from 1 to 4, we obtain the following ceteris paribus effects for a 30 years old respondent with an income of 640 to 690€/month given in Fig. 3.

Fig. 3: The influence of Education on WTP



This significant result (t-values > |4.6|) - but at first sight contra intuitive result - may be explained by...

[7] Calulated at the means of the income ranges.

...from the sample of 382 persons only 19 belong to the education class 3 and only 5 respondents have an university degree. Thus both groups are not satisfyingly represented and $\hat{\beta}_4$ could be influenced by outliers.

...with increasing education a higher proportion of the respondents are working in Santiago de Chile or travelling during the week. Therefore, for these people some environmental problems may not be perceived as important since they spent the weekends in the villages only.[8]

3.3. Critical discussion about the applied estimation method

For this primarily study, the presentation of the OLS results may have three advantages: Firstly, the interpretation of the coefficients is easy: In order to calculate the marginal effects $\partial \Pr ob[WTP_n = j] / \partial \mathbf{X}$, OLE and OPE require a nonlinear weighting of the parameters by the levels of the regressors (whereby the respective density functions serve as weights (for details, see Greene, 2000, p. 877)). However, with OLS the coefficients itself represent the marginal effects $\partial \mathbf{WTP} / \partial \mathbf{X} = \boldsymbol{\beta}$. Secondly, note the difference in the interpretation of the marginal effects. By using OLS we obtain a direct transformation of the categorical responses (of WTP) to a monetary metrical dimension, which is not true for the *standard* OLE and OPE. Furthermore, OLS is a semiparametric approach in the sense that it does not require a fully parametric specification about the error distribution but makes assumptions about its first two moments (equations [2] and [3]) only. In contrast

[8] Furthermore it could be hypothesised that in comparison to the lower educated respondents, persons with an education level of 3 and in particular of 4 may be more aware about their overall expenditure function and thus compensate for the "WTP-upward-bias" provoked e.g. by the embedding effect. Additional bias may result because lower educated people may not overlook their overall expenditure structure and thus overestimate their potential to pay for newly introduced goods without being in accordance with their budget constraint. Furthermore, in oral interviews respondents may often feel ashamed to appear too "egoistic" if they contest with a low WTP. However, if these respondent-interviewer-effects diminish with higher education is not clear at all and needs to be addressed in future research. For more discussion about the upward and downward biases see e.g. GARROD & WILLIS.

OLE or OPE require the stronger parametric assumption of a fully parameterized logistic or normal distribution of the error term respectively.

However, we do not want to leave this section without a short outlook of how our estimation results could be methodologically improved: In the '*standard OLE / OPE procedure*' $\boldsymbol{\beta}$ and $\boldsymbol{\mu}$ are estimated simultaneously, whereby $\boldsymbol{\mu}$ is a (J-1 ×1) parameter vector indicating the boundaries of a latent variable $\mathbf{y}^*$ which drives the choices according to $\mathbf{y^*}=\beta_0\mathbf{X}_0+\beta_1\mathbf{X}_1+\beta_2\mathbf{X}_2+....+\beta_K\mathbf{X}_K+\boldsymbol{\varepsilon}$. $\mathbf{y}^*$ relates to **WTP** by the set of functions $Prob(\mathrm{WTP}_n=j)=\mathrm{F}_{jn}(\mathbf{X},\boldsymbol{\beta})$. In order to identify this system in a maximum likelihood estimation, the variance, σ, is set to 1. However with a refined method, identification could be as follows: instead of estimating the parameters $(\boldsymbol{\beta},\boldsymbol{\mu}|\sigma)$ we could estimate $(\boldsymbol{\beta},\sigma|\boldsymbol{\mu})$. With such a transformation it is possible to calculate metrical values $\hat{WTP}_n$, because we know the limiting parameters $\mu_j \ \forall \ j$=1...J-1 apriori, which are just the limting values given in fig. 1. Unfortunately, to our knowledge no standard econometric software package is able to do this routinely. Since *standard* OLE and OPE were similar to the OLS estimates (see appendix) we so far avoided the programming effort (e.g. in GAUSS, EViews-Programming, etc.). Such a transformation, however, should be undertaken in future research to correctly evaluate our presented results.

3.4. The concept of benefit transfer and application

Benefit transfer is a technique in which the results of a *study sites* are use to forecast the WTP at new sites, called *policy sites*. Applying previous research findings to similar decision situations is a very attractive alternative to expensive and time consuming original research to quickly inform decision makers.

Using our data of the two villages we tested the benefit transfer concept: First, in addition to the variables presented in Table 1 we introduced a dummy variable for one village. This dummy was however insignificant which gave us the hint to cross check single village estimations with the following procedure.

a) We estimate two models for each village separately to obtain the parameter vectors $\hat{\boldsymbol{\beta}}_S$ and $\hat{\boldsymbol{\beta}}_I$, whereby S and I symbolize San Pedro and Isla de Maipo respectively.

b) Then we forecast $\mathbf{W\hat{T}P}_{I\_I} = \mathbf{X}_I\hat{\boldsymbol{\beta}}_I$

c) and calculate $\mathbf{WTP}_{I\_S} = \mathbf{X}_I\hat{\boldsymbol{\beta}}_S$, whereby the first index of a variable stands for the origin of the endogenous and exogenous variables and the second index points out by which parameters the WTP is estimated or calculated.

d) We take the sums $\overline{WTP}_{I\_S} = \sum_{n\in I} WTP_{I\_S\,n}$ and $\overline{WTP}_{I\_I} = \sum_{n\in I} \hat{WTP}_{I\_I\,n}$.

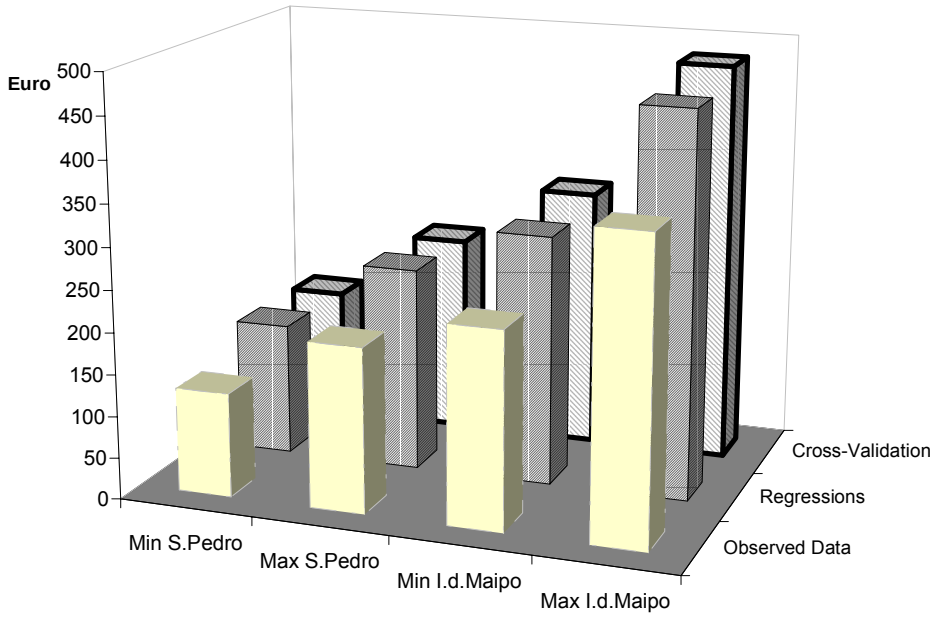
e) The same procedure a)-d) we apply for comparing the sums in San Pedro.

These results are given in tab. 2 and in fig. 3

Table 2: Minimal Monetary Value of the Funds in San Pedro and Isla de Maipo

San Pedro		Isla de Maipo	
$\overline{WTP}_{S\_S}$	$\overline{WTP}_{S\_I}$	$\overline{WTP}_{I\_I}$	$\overline{WTP}_{I\_S}$
167	164	315	379.575

Fig. 3: Minimal and Maximal Payments into the Funds calculated by three methods



The results are rather promising in the sense that under the assumption of the model the benefit function is robust at the mean. In tab. 2, minimal values payed into the funds are

calculated by the two methods described above. It may be concluded that the regression model of either village could have been used as a policy forecasting instrument for the respective other village. In fig. 3, in addition to $\overline{WTP}_{i\_j}$ the sum of the observed values of $\sum_{n \in i} WTP_n$ (i, j, indicating the name of the villages i=S,I) for each village are given. Furthermore, in addition to the so far "pessimistic" scenarios by calculating the sums by the mimimum values of the WTP_n ranges (e.g. € 0.75, € 1.501, etc.), we calculated the sum with the maximal values of the WTP-ranges (e.g. € 1.5, € 2.25).

Against the background that the regressors could explain 26% of the variance of WTP only, the policy recommendation to generalize our study site estimates to other policy sites must be handled with great care. We insofar could only show that for these two villages the mean is quite similar. However the variances of $\overline{WTP}_{I\_S}$, $\overline{WTP}_{S\_I}$ and $\sum_{n \in i} WTP_n$ are quite large.

Furthermore, remember that any regression result is conditional on the macro-influences of the particular region (in our case the metropolitan region of Chile) . Thus additional studies at other sites are needed to account for possible structural differences which may influence the parameter and forecast values.

4. Conclusions

The economic approach offers a logical mean of reaching balanced decisions on development and environmental protection. The CV method has permitted to determine the WTP of the interviewees for an environmental protection fund. The creation of this environmental fund is presented as a consensus solution. The results of this study permit the theoretical feasibility, as well as empirical to assign this methodology to the Chilean Environmental Politics, and specifically as a complement to the EIAS. The model results seem to be promising. However, some further assessment and methodological improvements (as outlined in chapter 3) is needed before to apply the concept more generally for policy recommendations.

Annex

Ordered Probit Estimation

Dependent Variable: RANGO

	Coefficient	Std. Error	z-Statistic	Prob.
Income	0.20	0.03	7.49	0.00
Age	-0.01	0.00	-2.30	0.02
Education	1.47	0.40	3.68	0.00
Education^2	-0.42	0.10	-4.13	0.00
Limit Points μ				
μ_1	0.66	0.44	1.48	0.14
μ_2	1.83	0.45	4.07	0.00
μ_3	2.37	0.46	5.22	0.00
μ_4	2.83	0.46	6.12	0.00
μ_5	3.28	0.48	6.90	0.00
μ_6	3.57	0.49	7.32	0.00

White Heteroskedasticity Test:

F-statistic	15.60	Probability	0.00
Obs*R-squared	128.55	Probability	0.00

Dependent Variable: Residual ($\mathbf{y}-\mathbf{X}\hat{\boldsymbol{\beta}}$)

Method: Least Squares

Sample: 1 382

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
constant	19.02	6.59	2.88	0.00
Income	1.78	0.73	2.44	0.02
Income^2	-0.05	0.02	-2.31	0.02
Income*age	0.00	0.01	0.59	0.55
Income*education	-1.36	0.55	-2.49	0.01
Income*(education)^2	0.39	0.15	2.65	0.01
age	0.03	0.08	0.41	0.68
age^2	0.00	0.00	0.57	0.57
age*education	-0.07	0.05	-1.41	0.16
age*(education)^2	0.01	0.01	0.82	0.42
education	-36.80	12.47	-2.95	0.00
education^2	21.55	6.83	3.15	0.00
education*(education)^2	-3.73	1.17	-3.18	0.00

R-squared	0.34	Mean dependent var	1.39
Adjusted R-squared	0.31	S.D. dependent var	2.40
S.E. of regression	1.99	Akaike info criterion	4.25
Sum squared resid	1458.39	Schwarz criterion	4.38

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