Economic Valuation of Environmental Values of the Landscape Development and Protection Area of Volcji Potok

Verbic, Miroslav and Erker, Renata
Institute for Economic Research Ljubljana

January 2007

ECONOMIC VALUATION OF ENVIRONMENTAL VALUES OF THE LANDSCAPE DEVELOPMENT AND PROTECTION AREA OF VOLČJI POTOK[1]

Miroslav Verbič and Renata Slabe Erker***

WORKING PAPER No. 32, 2007

Editor of the WP series: Boris Majcen

Ljubljana, Januar 2007

* Institute for Economic Research, Ljubljana, Slovenia, E-mail: miroslav.verbic@guest.arnes.si
** Institute for Economic Research, Ljubljana, Slovenia, E-mail: erkerr@ier.si

[1] The authors are indebted to Marta Vahtar from the Institute for Integral Development and Environment (ICRO) for all her help in preparing scenarios and their graphic presentation. We are also grateful to Ken Willis and Guy Garrod from the University of Newcastle upon Tyne for valuable advice. Needless to say, the authors are solely responsible for any remaining errors or misinterpretations.

Abstract

When the market for a certain good is competitive enough, economic activities can be studied by the market pricing mechanism. Because this is usually not feasible in case of environmental goods with embodied natural and cultural heritage, particular methods for economic valuation of such goods have to be applied. The present article represents the economic valuation of the Landscape Development and Protection Area of Volčji Potok, which is an important Slovenian cultural landscape area with internationally recognized characteristics. For this purpose we have chosen the method of contingent valuation and performed an econometric analysis of stated and true willingness-to-pay. We obtained the value of willingness-to-pay and determined its determinants. We also made an attempt to control for different biases that arise in such analyses. At last, we used the adjusted average individual value of willingness-to-pay to calculate the aggregate willingness-to-pay.

Key Words: bivariate probit model, contingent valuation method, discrete choice method, embedding effects, environmental values, starting point bias, willingness-to-pay.

JEL Classification: C51, Q51, Q56.

1. Introduction

Local communities often find themselves in a position where they have to decide on what spatial changes and development guidelines to implement within the scope of nationally or regionally adopted spatial and development planning documents. Their decisions must address not only operating costs, but also the positive and negative spatial impact of the development programmes on people's welfare. As the former are expressed in monetary terms and the latter only in terms of quantity or by way of description, it can happen that the spatial impact is under- or overrated in the intuitive decision-making process. Ensuring that spatial impact is given appropriate weight in the decision-making process, it is imperative to determine their monetary value.

In the case described in this article, the spatial impact of targeted development of the Landscape Development and Protection Area (LDPA) of Volčji Potok is evaluated, together with its natural and cultural goods. This is a landscape area with distinct characteristics of international importance. The purpose of the study was to evaluate the overall value of environmental goods, i.e. the use value and the non-use value for residents and visitors to the area. For this purpose, the contingent valuation method was selected; mainly due to significant non-use values in the area, the total value for residents and visitors and the varying selection of goods in this area. Only stated preference methods, such as contingent valuation method (*cf*. Garrod and Willis, 1999, pp. 125-126; Nunes *et al*., 2003, pp. 94-95; Verbič, 2006) can be used to estimate environmental values such as biotic diversity, landscape appearance, preservation of cultural and art collections, artefacts and the monuments, and features of old towns and villages.

Contingent valuation surveys were first proposed in theory by Ciriacy-Wantrup (1947) as a method for eliciting market valuation of a non-market good. The first practical application of the technique was done by Davis (1963) on the economic value of recreation in the Maine woods. Numerous applications of the method to various public goods and studies of its methodological properties were conducted worldwide in the 1970's and 1980's. A review of the theoretical and empirical basis of contingent valuation is presented in Mitchell and Carson (1989), Arrow *et al*. (1993) and, more recently, in Moons (2003), Venkatachalam (2004) and Schläpfer (2006). Nowadays, the method is widely used in cost-benefit analysis and environmental impact assessment. Recent applications that are relevant

for our study include Hadker *et al*. (1997), Cicia and Scarpa (2000), Lette and de Boo (2002), Navrud and Ready (2002), Laitila and Paulrud (2006) and Bateman *et al*. (2006).

The main concept of the contingent valuation method is to model individuals' responses in terms of their reactions in specific hypothetical situations. In the *ex ante* analysis in the case of environmental evaluation, questions related to the highest sum that individuals are prepared to pay for a change (improvement or purchase) at the environmental goods level (willingness-to-pay – *WTP*). Changes in the level of environmental goods can then be described by a number of different development scenarios. Two development scenarios were drawn up for the purpose of this evaluation. The form of the contingent valuation method was defined on the basis of scenarios and research objectives. In this article the classic contingent valuation and the discrete choice contingent valuation are combined.

The outline of the article is as follows. In Chapter 2, the Landscape Development and Protection Area of Volčji Potok is presented in brief. A description of the scenarios and questionnaire formation process then follows in Chapter 3. In Chapters 4 and 5 the article then offers an analysis of the stated willingness-to-pay and an analysis of the actual willingness-to-pay, respectively. In Chapter 6 the aggregate value of willingness-to-pay is being calculated. The article concludes in Chapter 7 with the key findings regarding the potential spatial policy for the relevant area.

2. The Landscape Development and Protection Area of Volčji Potok

The LDPA Volčji Potok is located in the vicinity of Ljubljana, the capital of Slovenia. It encompasses 2000 hectares of unspoilt natural landscape with numerous wetlands and rare plant and animal species. At the same time this is an area featuring exceptional cultural landscapes with many stately residences or castles and other cultural heritage monuments, and small settlements with a well preserved village character.

At the heart of the area are the villages of Blata and Mlake and the Češeniške and Prevojske Gmajne marshes which are sites of protected plants and bird species that fall under the aegis of the EU Habitat and Birds Directives. The cultural landscape area was named after the most famous landscaped park in this part of Slovenia – Volčji Potok Arboretum. Also included in the cultural landscape area is a section of the Kamniška

Bistrica river, which is important both ecologically and in terms of landscape and has rather well preserved water and riverside areas. Another characteristic of the Kamniška Bistrica is its many mill streams, with two larger ones reaching into the studied area. The last two watermills with mill stones are found in this area. They both used to be large mills and had Venetian saws. These water-powered buildings are today among the most endangered monuments of technical heritage and farm architecture in Slovenia. They are in fairly poor condition but could still be restored to some extent and preserved for future generations. The numerous medieval plains castles with castle parks give the landscape a special charm. The majority of these is at the moment in bad shape as well, but have great potential for revitalisation, in terms of expanding the area's tourist offer. To the north is a wooded aquifer with high-quality drinking water that is ranked among the best in the country. There are four water wells providing drinking water for a wider area.

The beauty and features of the area today face great developmental pressure due to their exceptional accessibility and the vicinity of settled areas. Alongside the neglected and disintegrating cultural heritage structures, the pressures involve immigration of non-indigenous inhabitants, increasing volume of traffic, deficient and in places unregulated public utility infrastructure and uncoordinated use of space. These pressures are a threat to realising a sustainable development vision based on reinstating a naturally and culturally protected area. The vision supports the ecological economy, sustainable development and the introduction of a network of paths for recreation, education and relaxation. This vision was used to design a scenario of targeted development for the purposes of the evaluation of the area (*cf*. Verbič and Slabe Erker, 2005, pp. 16-17).

3. Description of Procedures of Forming the Questionnaire and Scenarios

As stated in the introduction, two development scenarios were constructed for the evaluation of the area. An unplanned development scenario was drawn up as an extrapolation of the current state of affairs of the area. While the scenario based on targeted development corresponds relatively well to potentially optimal sustainable development. The final form of scenarios and the scheme for their presentation took into account certain findings of prior testing on a target group, such as emphasising the difference between active and passive measures, and underlining that existing institutions will be responsible for implementing the scenarios. Since there are only slight discrepancies between scenarios,

these can be somewhat highlighted in the survey, but it is difficult to make them more expressive *per se*, as the development of the area is limited by the current spatial and development planning documents.

3.1. Description of Development Scenarios

In the unplanned development scenario the area has a modern image of an agrarian landscape with effectively organised organic farms that are larger and more specialised in fruit and vegetable cultivation, livestock farming and aquaculture (see Figure 1). At the same time supplementary tourist activities develop along the lines of tourist farms and heritage presentation. Agricultural land on steeper slopes, where farming activity is economically less effective, are abandoned and overgrown by forest. The village character of the settlements changes, because abandoned farm buildings are being turned into residential or holiday homes, while dormitory towns are expanding at the edge of bigger settlements, partly as settlements with luxurious individual villas and partly as organised multi-dwelling buildings.

Day-trip, educational and recreational tourism is organised in the area, tied mainly to the vast areas of intact nature. The issue of a comprehensive renovation of rural castles and larger residences remains unresolved and the buildings continue to degrade due to inappropriate use as social housing, smaller business and company activities. The renovation of agricultural architectural heritage remains subject to private initiative. Support is given to various developmental incentives and therefore new activities are introduced in the area, such as crafts shops or service shops, but existing activities such as quarries have also expanded.

In the targeted development scenario the characteristic image of the area is a traditional rural landscape with preserved old villages, which gives the impression of late-19th century landscape. Farmers are given subsidies to finance traditional organic production, i.e. by keeping traditional orchards and growing old fruit varieties, indigenous cattle breeds and old field crop, which would help preserve and develop the quality components of the traditional cultural landscape. Different forms of financial incentive are also available to safeguard the traditional architectural identity of individual buildings.

Figure 1. Unplanned development scenario of the Landscape Development and Protection Area of Volčji Potok

Figure 2. Targeted development scenario of the Landscape Development and Protection Area of Volčji Potok

The traditional image of the cultural landscape, along with the conservation of natural landscape and revitalisation of cultural heritage, is one of the most important attractions for the development of cultural tourism, as it offers a chance for tourists – by means of diverse tourist programmes tied to the area's history – to "travel" to the time of highway robbers, coachmen and the golden age of rural castles with events like fairs, highwaymen's horse rides, gentile coach rides, and brigands' goulash (see Figure 2). Farms are involved in well-developed, supplementary tourism-related activities. Other forms of day-trip, educational and recreational tourism are also well developed, tied mainly to the vast areas of intact nature. Stationary tourism is focused on the revitalised rural castles. Further settlement of the area is being restricted and directed to the edge of the area, outside the central zone of the LPDA Volčji Potok.

If a positive decision is reached on the implementation of the targeted-development scenario, the funding will be raised via a supplement to the compensation fee for the use of building land in the area. The supplement would be introduced on 1 January 2006 for a period of five years.

3.2. Definition of the Form of Contingent Valuation

The form of the contingent valuation method can be defined on the basis of the developed scenarios, and a questionnaire subsequently drawn up, where mechanisms for bias control have to be taken into account. The method selection depends on various factors, including the purpose of research, a range of economic values for environmental goods, acceptability of specific assumptions of methods used, the significance of specific statistical errors and cognitive bias in individual methods, compliance of method application with economic theory, the robustness of obtained evaluations of utility, determining the evaluation time frame for the project or policy implementation process, the capability to produce a sufficiently accurate identification of the relevant population, and the capacity to aggregate the evaluations of utility (Verbič, 2004, pp. 76-83).

When the non-use value of environmental goods is significant, the only way to proceed is to use the stated preference methods from the very start. The stated preference methods, including the contingent valuation method, is also the only method that enables an accurate analysis of behaviour and motives, as their use facilitates changing the information level by

applying sub-samples. In order to evaluate individual characteristics of goods, the discrete choice method can also be used, provided the characteristics are not too closely correlated and the proposed changes represent a compromise between them. In our case the classic contingent valuation is combined with the discrete choice contingent valuation. This offers a high level of flexibility, which facilitates the evaluation of a larger and more diversified selection of environmental goods than would be possible with any of the individual methods for economic evaluation of environmental values.

Within the classical contingent valuation approach, first, in the test-survey phase, an open version of the method was used and then, based on the results obtained, a final version was selected for use in the survey. Individuals were asked in the final survey whether they were prepared to contribute a set (predetermined) lump sum payment for the implementation of the spatial project. The respondents had a dichotomous choice, to accept or reject the proposed sum, where the range of the utility criteria value is predetermined using an open form of the classical contingent valuation. The initial question leads to a follow-up question. In this approach, first proposed by Cameron and James (1987), one can assume that both the initial question and further questions imply the same probability distribution of values.

3.3. Development of Questionnaire Design Procedures

For the purpose of economic evaluation of the area, separate surveys were conducted among inhabitants and visitors to the area in order to establish possible differences in the viewpoints and responses of the two groups. The sample included 250 inhabitants and 250 visitors; all respondents had to be over 18 and if possible heads of the household.

The survey was in the form of personal interviews, primarily due to the proven effectiveness of this approach, especially in similar cases, when a relatively complex set of environmental goods is involved. This method of surveying is rather involved, so experienced researchers with expert knowledge were used. Visual aids are also used, which requires a high level of concentration from the respondent, and a great deal of stimulation from the researcher.

The final questionnaire was designed on the basis of the test-survey and the decision to carry out personal interviews. It was important that questions were included in the survey that would enable the presence of any bias to be detected and its significance to be established, as well as how to eliminate it, because the cognitive burden on the respondents in this method is considerable.

The first set of questions in the questionnaire was intended to establish rapport with the respondents and to determine their social, economic and demographic characteristics. Furthermore, to start with the respondents were assured that their answers will be confidential as an attempt to eliminate the potential social- and peer-desirability bias. In this set it is important to highlight the question regarding respondents' net monthly income and the net income of the respondent's household. These two income categories are very important, because they help, on one hand, to define the sum that the respondent is willing to pay and on the other hand they are the key explanatory variables in explaining the dynamics of the stated willingness-to-pay values. Precedence was given to the category of the net monthly income of respondents' household.

The second set of questions in the questionnaire served to identify the respondent's attitude to categories of economic development on the one hand and conservation of environmental goods, primarily the natural and cultural heritage on the other. On the basis of the respondents' reactions to statements it was possible to form “respondent development profiles”. It was assumed that the respondent's willingness-to-pay is related to the development profile to which they belong. Similarly to Hadker *et al*. (1997, p. 108), we created three profiles: extremely “green-oriented” individuals, extremely pro-development individuals and individuals between the two extrema. The information on the respondent's profile can be used as an explanatory variable, as a mechanism for identifying the real non-use value for the respondent and their real attitude towards the environment and space or to identify the authenticity of the willingness-to-pay values.

The third set of questions was intended to identify the respondents' knowledge of the studied area and to find out their perceptions of the objectively identified problems that affect the area. First a presentation of the area's qualities was carried out, based on improvising in interaction with the respondent, where visual material was used in addition to descriptions of the natural and cultural heritage and problems in the area. Despite this

improvisation, the researcher still aimed to approach each respondent in as uniform a manner as possible. Respondents have been asked whether the information presented was new to them, how often they used individual goods and explicitly which types of value mattered to them. This was intended to discover the differences between the results of the direct and indirect approach to identifying respondents' values. It was assumed that a larger recognised value for an area implies a greater willingness-to-pay for the realisation of the targeted development scenario. Later on this data can also be used in the analysis of the embedding effects.

This was followed by a visual presentation and description of the unplanned development scenario of the area (Figure 1). The researcher explained to the respondents that if today's trends were to continue in the wider area of Volčji Potok, in time the scenario presented would come true; and asked the respondents about concerns regarding the situation and the scope of damage that in their opinion this might cause.

The fourth set of questions finally led to the contingent valuation itself. This time there was a visual presentation and description of the targeted development scenario in the area (Figure 2), with an explanation that the implementation of the scenario would be taken on by an existing trustworthy local institution. This was an attempt to establish trust in the respondent and to avoid a protest response. It also represented the desire to acquire an exclusive value of willingness-to-pay and not a value that would relate to all similar projects. Moreover, it was explained to the respondent that the costs of a scenario being implemented by an institution, which would also be in charge of conserving and improving the landscape, would have to be financed appropriately, so the questions in this set will relate to the financing of the institution in the period from 2006 to 2010, even though protection is a long-term process and is actually always required. Payments shall be made in the form of a supplement to the compensation fee for the building site use.

In order to reduce potential biases as much as possible, respondents were encouraged to seriously consider their true preferences before answering this set of questions. They were reminded that the problem of conserving heritage is only one of the challenges faced by municipalities in the area and that the wider area of Volčji Potok is only one among many important quality landscape areas in Slovenia. Furthermore it was brought to the respondent's attention that their income is limited and that they can use it for various other

purposes. The respondent was being asked to focus on the area shown on the map, despite the existence of many other environmental and spatial issues that could be of major importance. This approach addressed the concepts of an individual's budgetary limits, embedding effects, part-whole bias, bias arising from the symbolic value, and satisfaction arising from the "warm-glow effect" (*cf*. Nunes and Schokkaert, 2001).

This was followed by two dichotomous-choice questions relating to willingness-to-pay for the realisation of the targeted development scenario. Respondents were first asked whether they are willing to pay an initial sum from their household's income each year for the next five years in order for this scenario to be realised. The researcher determined the initial sum of willingness-to-pay using an income scale for the respondent and their household with the relevant willingness-to-pay values. The researcher stated both the monthly and the annual sum of this willingness-to-pay value to avoid the likelihood of mistakes in the perception of this sum by the respondent. The respondent could accept or reject this sum, but could also choose not to reply, which terminated the interview and made such an interview invalid.

Respondents were then asked if they are willing to pay a further sum. This sum is twice the initial sum if the respondent replied affirmatively to the previous question and half the initial sum if he or she replied in the negatively. The reasons given for the affirmative or negative answer were also noted for the purpose of determining protest responses. This was followed by a question on the maximum monthly household income that the respondent was willing to pay over the next five years for the realisation of the targeted development scenario. The function of this question was to establish the range and anchoring effects.

4. An Analysis of the Stated Willingness-to-pay

Prior to starting the analysis of stated willingness-to-pay, Table 1 gives some descriptive statistics of the key variables. The database has 312 valid observations, 149 of which represent inhabitants and 163 represent visitors. The average age of respondents included in the sample is 46.8 years, ranging from 18 to 87 years. The average monthly income of respondents amounts to SIT 153,045, which is slightly lower than the Slovenian average, but here one must take into account the under-reporting bias – unwillingness of individuals to state the actual value of their monthly income. The under-reporting bias is

usually related to the fear of higher taxation being applied and leads to considerable underrating of the respondent's income (*cf*. Van der Laan and van Tuinen, 1996). The net monthly income of the respondent's household thus amounts to SIT 379,006, and net monthly income per household member amounts to just SIT 54,084. The average final value of willingness-to-pay[2] is SIT 388 with the average highest value of willingness-to-pay being SIT 475.

This section analyses the stated willingness-to-pay (SWTP). As this involves a continuous variable, the relevant question for the analysis relates to the highest sum that the respondent was willing to pay over the next five years for the realisation of the targeted development scenario in the area. A linear regression model was used to estimate the values of regression coefficients using the least squares (LS) estimator. If a version of the model proved to exhibit heteroskedasticity, an attempt to attain the validity of the homoskedasticity assumption was made using appropriate adjustments of the estimator.

Table 1. Descriptive statistics of key variables (n = 312)

Variable	Arithmetic mean	Standard deviation	Lowest value	Highest value
Respondent's age	46.8	14.8	18	87
Years of schooling	12.5	2.6	0	18
Respondent's net monthly income in SIT	153,045	85,840	25,000	480,000
Number of household members	3.5	1.5	1	9
Household's net monthly income in SIT	379,006	219,800	50,000	1,800,000
Net monthly income per household member in SIT	54,084	40,870	3125	325,000
Final value of willingness-to-pay in SIT	388	537	0	2000
Highest value of willingness-to-pay in SIT	475	1119	0	10,000

Source: IER Database on Economic Valuation of LDPA Volčji Potok (2005); own calculations.

[2] This refers to willingness-to-pay in the last question to which the respondent replied affirmatively, i.e. either the initial or the further question. If the respondent did not reply to either of the two questions affirmatively, the value of willingness-to-pay was set to be equal to zero.

The analysis of stated willingness-to-pay will be used to verify whether the expectations expressed on the basis of economic theory appear to be true. It will also enable us to study the content validity and framing effects of the contingent valuation procedure (*cf*. Hadker *et al*., 1997, pp. 112-114; Verbič and Slabe Erker, 2004). This will indicate whether the questions the respondents were asked were adequate, whether the respondents responded adequately to the questions asked and whether their answers meet the expectations of standard economic theory. In order to achieve this, we shall proceed as follows. First, we shall estimate the determinants of the stated willingness-to-pay and then we will make an attempt towards determining and eliminating biases in the model; the analysis will mainly involve the starting point bias and the embedding effects.

4.1. Determinants of the Stated Willingness-to-pay

Some variables turned out to be statistically significant determinants of willingness-to-pay. These include: the respondent's income, the frequency of visiting the environmental goods, environmentally and spatially-related preferences expressed by the respondent and the respondent's attitude to environmental goods. In the model, the respondent's age is a statistically insignificant determinant of willingness-to-pay at a still acceptable significance level. However, if one assumes the risk and study the respondent's age as an independent determinant of willingness-to-pay, one can conclude that the correlation between the two variables is negative. Also the respondent's gender and status are not in statistically significant correlation to the willingness-to-pay. This means that based on the sample, one cannot conclude that the visitors of the LDPA Volčji Potok are acting differently from the inhabitants of the area or that they perceive the environmental goods and their inherent natural and cultural heritage[3] differently. There is, however, a difference with regard to the respondent's level of education, where an additional year of schooling has a positive impact on the respondent's willingness-to-pay.

The size of the respondent's household is not a statistically significant variable of willingness-to-pay at a still acceptable significance level, but it can be concluded that there exists a positive independent impact on the willingness-to-pay, which can be explained through the existence of economies of scale within the household. The respondent's activity

[3] It therefore makes no sense to include in the model the variable of duration of the inhabitants' living in the LDPA Volčji Potok, since this variable was not statistically significant.

is also correlated to his or her willingness-to-pay, but only as an independent determinant; employed and self-employed persons in our sample stated greater willingness-to-pay compared to the average, while farmers and retired persons stated a lower willingness-to-pay.

The only willingness-to-pay determinant from among the respondent's socio-economic characteristics that is statistically significant enough to be included in our model is net monthly income, which is in line with the economic theory. The greatest explanatory power is reached when the respondent's net monthly income variable (*INCOME*) is included. This is formed on the basis of the income brackets used. The data indicates (see Table 2), that every thousand tolars of the respondent's income, *ceteris paribus*, increases on average the value of willingness-to-pay by SIT 3.02. Using the net monthly income of the respondent's household and the net monthly income per household member (after correction due to the size of household) on average provides similar results, but with a slightly lower level of statistical significance. As the respondent's income has a fairly strong positive correlation to his or her level of education, the latter is not included in the model.

Table 2. Estimation results for the model of stated willingness-to-pay

Dependent variable	*SWTP*		
n	312		
s_{e_2}	899.70		
$R^2_{adj.}$	0.420		
F (7, 304)	24.65	p (F)	0.000
Explanatory variable	b_i	t	p (t)
Constant	–275.20	–1.54	0.125
INCOME	3.021	4.87	0.000
CONSC	569.83	3.67	0.000
DAMAGE	238.48	2.09	0.037
HERITAGE	518.03	3.60	0.000
FUNCT	657.50	3.01	0.003
VALSCL	154.89	2.26	0.025
PROTEST	–204.99	–2.42	0.016

Source: IER Database on Economic Valuation of LDPA Volčji Potok (2005); own calculations.

Conscientious respondents, who place natural and cultural heritage conservation for current and future generations ahead of their momentary life standard (dummy variable *CONSC*), state on average a higher willingness-to-pay. A conscientious individual is on

average, *ceteris paribus*, willing to pay as much as SIT 569.8 more than other respondents for the realisation of targeted development in the area. Both the level of concern of the respondent about unscheduled development in the area and their perception of probable damage to the area due to unscheduled development have a positive impact on the respondent's willingness-to-pay, but these are also mutually correlated. The latter determinant (*DAMAGE*) was selected and quantified in the form of a dummy variable, which has the value 1, if the individual perceives the size of damage to the area due to unscheduled development as very large, and value 0 otherwise. One can conclude that such respondents are on average, *ceteris paribus*, willing to pay SIT 238.5 more than other respondents for the realisation of targeted development in the area.

Furthermore, respondents that attributed a higher value to natural and cultural heritage, forests, vegetal and animal species and the environment in the area (dummy variable *HERITAGE*) are on average, *ceteris paribus*, willing to pay SIT 518.0 more for the realisation of the targeted development scenario than other respondents. Respondents that attribute a higher value to the functional characteristics of the area, such as the use of cycle tracks and footpaths, intact drinking water and various tourist activities (dummy variable *FUNCT*) are on average, *ceteris paribus*, willing to pay as much as SIT 657.5 more for the realisation of the targeted development scenario than other respondents.

The variable expressing the number of values embodied in the area's environmental goods that the respondent deems important (*VALSCL*), is an important, statistically significant factor of willingness-to-pay. Each added value that the respondent perceives as important in the area, on average, *ceteris paribus*, increases the value of his or her willingness-to-pay by SIT 154.9. However, one must not forget the respondents' protest responses. An individual that considers that the implementation of the targeted development scenario should be financed by someone else (dummy variable *PROTEST*) is on average, *ceteris paribus*, willing to pay SIT 205.0 less for the realisation of this scenario than the other respondents, which is in line with economic theory.

When these seven explanatory variables are included in the model, the constant term is no longer statistically significantly different from 0. The value of the multiple regression coefficient of determination and the value of the *F*-statistic are acceptable as the sample contains measurement errors that are related to the collection of primary data with such a

complex survey. Although the willingness-to-pay variable cannot have a negative value, the estimated distribution of willingness-to-pay ranges from negative infinity to positive infinity. The estimated value of willingness-to-pay for average values of explanatory variables is SIT 474.80.

4.2. Determining and Eliminating Biases in the Model

Biases can be addressed econometrically, in as much as they can be determined using proxy variables. The analysis focuses on starting point bias and embedding effects.

The starting point bias value is measured by using the willingness-to-pay amount that was offered to individuals for the realisation of the targeted development scenario. The relevant variable (*BID1*) should have been included in the stated willingness-to-pay model, but this was unfortunately not possible due to multicollinearity issues. The willingness-to-pay value was selected in relation to the income of the respondent's household. The adequate regression coefficient for impact on the willingness-to-pay value of a respondent's stated willingness-to-pay is therefore estimated in an adjusted model, which gave the value of 0.461.

The *BID1* variable is a statistically highly-significant determinant of stated willingness-to-pay, which as a rule implies that respondents have a rather poor knowledge of the process for evaluating environmental goods. Starting point bias value effects are also called anchoring effects. In order to eliminate this bias the proposed value of willingness-to-pay must be set to 0, which then gives an actual stated willingness-to-pay value of SIT 241.64.

If the sample is subject to the part-whole bias, the stated willingness-to-pay value does not merely refer to the realisation of the targeted development scenario in the area but also to other environmental goods, activities and their consequences. This bias value is measured using the environmental values of the area that were deemed important by individual respondents. The variable reflecting the number of values of environmental goods that the respondents deemed important (*VALSCL*) is therefore set to 0, which enabled the inclusion of respondents that expressed willingness-to-pay for the realisation of the targeted development scenario, but who did not ascribe any special value to any of the

environmental goods in the area. Once this is done, a new willingness-to-pay value is obtained, which is SIT 130.07 lower than the initial value, and amounts to SIT 344.73.

In modelling the stated willingness-to-pay, determining the bias effects certainly plays an important role in understanding individuals' behaviour. It is however relevant at this point to establish to what degree it makes sense to eliminate such biases from the stated willingness-to-pay when reporting the willingness-to-pay value. Part-whole bias is without doubt a cause in which a group of environmental goods that affect the individuals' decision on their potential willingness-to-pay for the realisation of a specific environmental change may well be a real factor in their willingness-to-pay. When deciding whether to eliminate bias effects in willingness-to-pay analysis, it is therefore necessary to keep in mind the specific situation that the individual is deciding on.

5. An Analysis of the True Willingness-to-pay

Open questions are often subject to criticism (*cf*. Garrod and Willis, 1999; Bateman *et al*., 2002), as they are seen to provide unreliable responses when the respondents are not very familiar with the issues of contingent valuation and because they offer little control of the respondents' strategic behaviour. Closed questions provide respondents with information that is easy to evaluate, but at the same time the characteristics of questions that enable simple acceptance or rejection of proposed values also prevent any strategic behaviour in the part of the respondents. Indirect (unobserved) value of the utility criterion obtained in this way is in literature often called the "true" willingness-to-pay. In open questions the explained variable, i.e. willingness-to-pay is a continuous and directly observed variable, which makes it easier to analyse. In closed questions the only observable variable is the qualitative dichotomous choice variable – a proxy of willingness-to-pay, which in turn determines the use of qualitative response models in the analysis.

In order to fulfil our goals, we shall proceed as follows. First, we shall define the unobserved willingness-to-pay model and then we will select the determinants that are used in the estimation of the (directly observed) proxy of willingness-to-pay. Finally, we will present the estimation results for the true willingness-to-pay model.

5.1. Modelling the True Willingness-to-pay

In order to model the true willingness-to-pay, the double-bounded dichotomous choice contingent valuation model is used, which is more information intensive and asymptotically more efficient than the single bounded method (Hanemann *et al*., 1991). The corresponding value function is a function of the true willingness-to-pay. With the help of such value functions the respondents evaluate both proposed willingness-to-pay values consecutively. Their basic response is represented by the following expression:

$$\mathbf{T}_{WTP} = \mathbf{x}'\boldsymbol{\beta} + \mathbf{e}, \tag{1}$$

where $\mathbf{T}_{WTP}$ represents a vector of values of the dummy response variable, $\mathbf{x}$ is a matrix of values of explanatory variables, $\boldsymbol{\beta}$ is a vector of regression coefficients and $\mathbf{e}$ represents a vector of residuals.

The follow-up willingness-to-pay value depends on the respondent's response to the first willingness-to-pay value that was proposed (B_m); if the first value is rejected, the second value is worth half as much (B_l), whereas, if the first value is accepted, the second value is doubled (B_u). With the obtained responses two binomial discrete variables are formed that have the characteristics of the dependent variable. The appropriate variant of a bivariate probit regression model is used when explaining the "true" willingness-to-pay, with the assumption that the two decisions are interconnected and the errors of the two regressions correlated; this increases estimation efficiency despite the evaluation of an additional parameter measuring coefficient of correlation between random errors in both regression equations (ρ). The values of regression coefficients are estimated by applying the maximum likelihood (ML) estimator.

In the bivariate probit regression model, dependent variables represent the respondents' response to the initial (*RESP1*) and the follow-up willingness-to-pay value (*RESP2*). These are binary variables that take the value 0, if the respondent accepts the proposed value and 1 otherwise. The following can be classified as the determinants of willingness-to-pay (explanatory variables): (1) respondents' net monthly income (*INCOME*); (2) visitation rate of the environmental goods in the area (*VRATE*); (3) respondents' consciousness (*CONSC*); (4) level of respondents' concern over the unscheduled development in the area

(*CONCERN*); (5) perception of potential damage in the area due to unscheduled development (*DAMAGE*); (6) goods in the area that were higher evaluated by respondents (*PCALM*, *HERITAGE* and *FUNCT*), and (7) number of values of environmental goods that the respondents deemed important (*VALSC*). More detailed evaluation results for the true willingness-to-pay model are set out below.

5.2. Estimation of the True Willingness-to-pay Model

For the purpose of analysing the authentic willingness-to-pay, it is important to eliminate all protest responses from the sample before evaluating the true willingness-to-pay, which reduces the number of observations to 203. The descriptive statistics of some of the key variables may now be somewhat different from the ones in Table 1, where 312 observations were included. The respondents' average net monthly income is higher (SIT 160,837) and closer to the statistical mean in the Republic of Slovenia for the studied year, and the same holds for the average net monthly household income (SIT 389,901) and the average net monthly income per household member (SIT 56,212) with the same average household size (3.4 members). A significant increase is noticed in the average maximum willingness-to-pay value, which increases by 52.6 per cent, i.e. to SIT 725, and in the average final willingness-to-pay value that increases by as much as 53.9 per cent, i.e. to SIT 597.

The average "true" willingness-to-pay value (μ_{TWTP}) is calculated in the following manner (Haab and McConnell, 2002):

$$\mu_{TWTP} = -\frac{\beta_0}{\beta_1}, \tag{2}$$

where β_0 is the regression constant value, and β_1 the regression coefficient value for the proposed willingness-to-pay value in the bivariate probit regression model, the evaluation results of which are presented in Table 3. The explanatory variables are the initial (*BID1*), and the follow-up willingness-to-pay values (*BID2*) that were proposed to respondents in the survey.

Table 3. Determining the average willingness-to-pay value

Dependent variable	*RESP1*		
Explanatory variable	b_i	z	p (z)
Constant	0.3002	1.46	0.144
BID1	–0.00083	–2.35	0.019
Dependent variable	*RESP2*		
Explanatory variable	b_i	z	p (z)
Constant	0.3276	2.33	0.020
BID2	–0.00078	–2.10	0.037
ρ (1, 2)	–0.3451	–2.59	0.009
n	203		
LogL	–268.52		

Source: IER Database on Economic Valuation of LDPA Volčji Potok (2005); own calculations.

The results in Table 3 are the basis for the calculation of the "true" willingness-to-pay value at the initially proposed value of SIT 359.48 and at the follow-up value of SIT 419.67. The comparison of obtained results to the evaluation results for the stated willingness-to-pay shows that the new values are slightly lower than the non-adjusted willingness-to-pay value that amounted to SIT 474.80, and slightly higher than the adjusted values from Section 4.2.

The correlation coefficient between random errors of the two regression equations is significant (–0.35) and is statistically significantly different from 0, which indicates that the evaluation of bivariate probit model resulted in greater estimation efficiency. This can be confirmed by comparing results in Table 3 to the separate estimation of the two probit regression models (*cf.* Verbič and Slabe Erker, 2005). The greatest advantage is shown in the evaluation of the respondents' further response where the standard errors of evaluation of regression constant and regression coefficient are reduced significantly.

5.3. Determinants of the True Willingness-to-pay

Let us now consider the impacts of the variables, presented in Section 5.1 on the probability of the respondent to accept the proposed willingness-to-pay value. The estimation results of the bivariate probit model are presented in Table 4. They again show that the value of correlation coefficient between random errors of both regression equations

is relatively high (–0.64) and statistically significant, which indicates that the estimation of bivariate probit model resulted in greater estimation efficiency.

It can be established that the net monthly income (*INCOME*) has a statistically significant positive impact on both the respondents' initial and subsequent decision on their contribution towards the realisation of the targeted development scenario. Namely, the regression coefficient is –0.0024 at the respondent's initial response and –0.0031 at the subsequent response, which means that the higher the income the lower the probability that the respondent shall reject the proposed willingness-to-pay value. The marginal effect of the income impact on the individual's decision (not stated in Table 4), amounts to –0.00094, which means that per each thousand tolars of respondent's net monthly income, at average values of all other variables, the probability of accepting the proposed willingness-to-pay value on average increases by 0.09 percentage points.

Visitation rate of the environmental goods in the area (*VRATE*) has a positive impact on individual's further decision on willingness to contribute towards the realisation of the targeted development scenario, while no impact on the individual's initial decision was found at a satisfactory significance level. The value of the relevant regression coefficient is –0.4991 and the value of the relevant marginal effect is –0,00026, which means, that an additional visit by an individual to any of the environmental goods in the area, at average values of all other variables, on average increases the probability of accepting the proposed subsequent willingness-to-pay value by 0.03 percentage points. The value of the marginal effect may seem low but it has to be taken into account that the average visit to environmental goods in the area was calculated as non-weighted average visitation of individual environmental goods, including transit by the inhabitants of the area across certain parts of the cultural landscape, such as villages and agricultural landscape.

Also the respondents' consciousness or awareness (*CONSC*) that led them to give priority to the conservation of the natural and cultural heritage for the present and future generations with respect to their current standard of living was found to be a statistically significant determinant in the individual's subsequent decision on willingness to contribute to the realisation of the targeted development scenario. The regression coefficient is –0.3868, which means that in respondents with this awareness the probability of rejecting the subsequently proposed willingness-to-pay value reduces, compared to other respondents.

The marginal effect is –0.0208, which means that for these aware respondents (with average values for all other variables) the probability of accepting the subsequently proposed willingness-to-pay value increases by 2.08 percentage points.

Table 4. Estimation results for the model of true willingness-to-pay

Dependent variable	*RESP1*		
Explanatory variable	b_i	z	p (z)
Constant	0.7009	3.07	0.021
INCOME	–0.0024	–2.26	0.025
CONCERN	–0.4858	–2.20	0.028
DAMAGE	–0.5481	–3.06	0.022
PCALM	–0.5552	–2.38	0.018
HERITAGE	–1.2077	–5.71	0.000
FUNCT	–0.6654	–2.13	0.033
VALSC	–0.6258	–3.98	0.000
Dependent variable	*RESP2*		
Explanatory variable	b_i	z	p (z)
Constant	0.9765	4.34	0.000
INCOME	–0.0031	–2.79	0.005
VRATE	–0.4991	–2.27	0.023
CONSC	–0.3868	–1.72	0.086
PCALM	–0.5290	–2.30	0.022
HERITAGE	–0.6735	–3.50	0.001
FUNCT	–0.4653	–2.01	0.049
VALSC	–0.3943	–3.21	0.001
ρ (1, 2)	–0.6394	–5.12	0.000
n	203		
LogL	–251.30		

Source: IER Database on Economic Valuation of LDPA Volčji Potok (2005); own calculations.

In contrast to the two previous variables the level of concern over the unscheduled development in the area (*CONCERN*) only proved to be a statistically significant determinant in relation to an individual's initial decision on willingness to contribute towards the realisation of the targeted development scenario. The regression coefficient is –0.4858, which means that in case of respondents with great concerns over the events in the area the probability of rejection of the initially proposed willingness-to-pay value reduces, compared to other respondents. The marginal effect is –0.1867, which means that for

concerned respondents (with average values for all other variables) the probability of accepting the initially proposed willingness-to-pay value increases by 18.7 percentage points.

Similarly the perception of potential damage in the area due to unplanned development (*DAMAGE*) was only found to be a statistically significant determinant in relation to the initial decision on the willingness to contribute towards the realisation of the targeted development scenario. The regression coefficient is –0.5481, which means that in case of respondents' perception of damage in the area due to unplanned development as considerable, the probability of rejection of the initially proposed willingness-to-pay value reduces compared to other respondents' perceptions. The marginal effect is –0.2090, which means that for such respondents (with average values for all other variables) the probability of accepting the initially proposed willingness-to-pay value increases by 20.9 percentage points.

Respondents who attributed a high value to peace and quiet in the area (*PCALM*) were statistically significantly more likely to accept both the initial and the follow-up willingness-to-pay value. The regression coefficient is –0.5552 at the respondents' initial response and –0.5290 at the subsequent response, which means that the probability of such respondents rejecting the proposed willingness-to-pay values reduces. The marginal effect is –0.2333, which means that (average values for all other variables) the probability of accepting the proposed willingness-to-pay value increases by 23.3 percentage points.

Respondents who attributed a high value to the natural and cultural heritage, forests, vegetal and animal species and the environment in the LDPA Volčji Potok (*HERITAGE*), were also statistically significantly more likely to accept the initial and follow-up willingness-to-pay values. The regression coefficient is –1.2077 at the respondents' initial response and –0.6735 at the subsequent response, which means that the probability of such respondents rejecting the proposed willingness-to-pay values reduces. The marginal effect is –0.4792, which means that (with average values for all other variables) the probability of accepting the proposed willingness-to-pay value increases by as much as 47.9 percentage points. It has to be emphasised that almost half of the respondents fell into this category.

In the same way respondents who attributed a higher value to the functional characteristics of the area such as the use of cycle tracks and footpaths, intact drinking water and various tourist activities (*FUNCT*) were statistically significantly more likely to accept the initial and follow-up willingness-to-pay values. The regression coefficient is –0.6654 at the respondents' initial response and –0.4653 at the subsequent response, which means that the probability of such respondents rejecting the proposed willingness-to-pay values reduces. The marginal effect is –0.2323, which means that (with average values for all other variables) the probability of accepting the proposed willingness-to-pay value increases by 23.2 percentage points.

As regards the impact of the number of environmental goods values in the LDPA Volčji Potok, deemed as important by a respondent (*VALSC*) on his or her decision to contribute to the realisation of the targeted development scenario, it can be stated that this impact is positive and statistically significant. The regression coefficient is –0.6258 at the respondents' initial response and –0.3943 at the subsequent response, which means that the probability of such respondents rejecting the proposed willingness-to-pay values reduces. The marginal effect is –0.2930, which means that on average each additional perceived value in such respondents, (with average values for all other variables) increases the probability of accepting the initially proposed willingness-to-pay value by 29.3 percentage points.

6. The Aggregate Willingness-to-pay

The aggregation of data takes into account the area covering the three municipalities in which the LDPA Volčji Potok is located, i.e. Domžale, Lukovica and Kamnik. The true willingness-to-pay value (with protest responses eliminated from the sample in advance) was used as the average individual value of willingness-to-pay for aggregation purposes. Two such willingness-to-pay values were calculated; the value for the initial response, which was SIT 359.48, and the follow-up value, which was SIT 419.67. Since in 63.5% of cases, the respondent either accepted or rejected both willingness-to-pay values, it can be concluded that the follow-up willingness-to-pay value is closer to the unobserved true willingness-to-pay. Additionally, even in case of mixed responses from respondents each of the two WTP values has the same probability of being closer to the unobserved true WTP

value. For these reasons, the individual WTP amount of SIT 419.67 – calculated from respondents' follow-up response – was used hereinafter.

The base for aggregating WTP values was largely defined already with the selection of the form of payment for realisation of the targeted development scenario. Since this was defined as a supplement to the compensation fee for the use of building land, this covers all those liable to pay such a fee in the municipalities of Domžale, Kamnik and Lukovica. Since those liable could be required to pay for land built on or land not built on, a suitable correction (reduction) must be made to the data on the number of those liable to payment, which was acquired from the relevant municipal administrations. As the data on coverage of payers for building land that is built-on and building land that is not built-on was not obtained from all three municipalities, a partial estimate has to be made. Therefore the estimated total number of persons liable for payment of the supplement was 19,332.

If one assumes that the value that inhabitants of and visitors to the LDPA Volčji Potok are prepared to contribute for the realisation of the targeted development scenario is the same as their perception of the area's value, then based on the aggregation results, one can state that the value of the LDPA Volčji Potok for inhabitants and visitors is approximately SIT 8.1 million per month, and hence 97.4 million per year and SIT 486.8 million over the entire anticipated period (2006-2010). If one then assumes a 3% annual discount rate, then the present value for realising the targeted development scenario in the LDPA Volčji Potok for inhabitants and visitors totals approximately SIT 96.1 million for the first year and SIT 449.0 million for the entire period (2006-2010).

7. Conclusion

The article represents economic valuation of the Landscape Development and Protection Area of Volčji Potok, which is an important Slovenian cultural landscape area with internationally recognized characteristics, by the use of contingent valuation method. Within this framework we have performed an econometric analysis of stated and true willingness-to-pay. Stated value of willingness-to-pay was positively affected by the respondent's income, his consciousness, his concern about unscheduled development in the area, his perception of probable damage to the area, his perception of natural and cultural heritage in general, and the number of values embodied in the area's environmental goods.

Respondents' protest responses, on the other hand, lowered the stated willingness-to-pay value. Starting point bias and part-whole bias substantially reduced the value of stated willingness-to-pay as well.

After the elimination of protest responses from the sample, the true willingness-to-pay has been evaluated. The values obtained were slightly lower than the non-adjusted willingness-to-pay from the stated willingness-to-pay analysis. Respondents' decision to contribute towards the realisation of the targeted development scenario was positively affected by his income, his consciousness, the visitation rate of environmental goods in the area, level of respondents' concern about unscheduled development in the area, his perception of potential damage in the area, his preferences for particular environmental goods in the area, and the number of values of environmental goods that the respondents deemed important.

At last, the adjusted average individual value of willingness-to-pay was used in order to calculate the aggregate willingness-to-pay. The aggregate value obtained seems to provide a relatively good reflection of the inhabitants and visitors' perception of the use-value, and above all the non-use value of the LDPA Volčji Potok. It therefore makes sense with regard to potential future planning policy in this area to compare the value obtained for the area with current total allocated expenditure in order to be able to plan and achieve the optimal development policy for the LDPA Volčji Potok.

References

Arrow, K. J., Solow, R., Portney, P. R., Leamer, E. E., Radner, R. and Schuman, H. (1993) Report on the National Oceanic and Atmospheric Administration (NOAA) Panel on Contingent Valuation, *Federal Register*, 58, 10, 4601-4614.

Bateman, I., Carson, R., Day, B., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Özdemiroglu, E., Pearce, D. W., Sugden, R. and Swanson, J. (2002) *Economic Valuation With Stated Preference Techniques: A Manual*, Edward Elgar, Cheltenham.

Bateman, I. J., Cole, M. A., Georgiou, S. and Hadley, D. J. (2006) Comparing Contingent Valuation and Contingent Ranking: A Case Study Considering the Benefits of Urban River Water Quality Improvements, *Journal of Environmental Management*, 79, 3, 221-231.

Cameron, T. A. and James, M. D. (1987) Efficient Estimation Methods for Closed-Ended Contingent Valuation Survey Data, *Review of Economics and Statistics*, 69, 269-276.

Cicia, G. and Scarpa, R. (2000) Willingness to Pay for Rural Landscape Preservation: A Case Study in Mediterranean Agriculture, Nota di lavoro, 59, Fondazione Eni Enrico Mattei, Milano.

Ciriacy-Wantrup, S. V. (1947) Capital Returns from Soil-Conservation Practices, *Journal of Farm Economics*, 29, 1188-1190.

Davis, R. (1963) The Value of Outdoor Recreation: An Economic Study of the Maine Woods, Doctoral Dissertation in Economics, Harvard University, Harvard, MA.

Garrod, G. D. and Willis, K. G. (1999) *Economic Valuation of the Environment: Methods and Case Studies*, Edward Elgar, Cheltenham.

Haab, T. C. and McConnell, K. E. (2002) *Valuing Environmental and Natural Resources: The Econometrics of Non-market Valuation*, Edward Elgar Publishing, Cheltenham.

Hadker, N., Sharma, S., David, A. and Muraleedharan, T. R. (1997) Willingness-to-pay for Borivli National Park: Evidence from a Contingent Valuation, *Ecological Economics*, 21, 2, 105-122.

Hanemann, W. M., Loomis, J. and Kanninen, B. J. (1991) Statistical Efficiency of Double Bounded Dichotomous Choice Contingent Valuation, *American Journal of Agricultural Economics*, 73, 1255-1263.

Laitila, T. and Paulrud, A. (2006) A Multi-Attribute Extension of Discrete-Choice Contingent Valuation for Valuation of Angling Site Characteristics, *Journal of Leisure Research*, 38, 2, 133-142.

Lette, H. and de Boo, H. (2002) Economic Valuation of Forests and Nature: A Support Tool for Effective Decision-making, Theme Study, 6, EC-LNV, Ede.

Mitchell, R. C. and Carson, R. T. (1989) *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Resources for the Future, Washington, DC.

Moons, E. (2003) The Development and Application of Economic Valuation Techniques and Their Use in Environmental Policy: A Survey, Working Paper, 7, Faculty of Economics and Applied Economic Sciences, Leuven.

Navrud, S. and Ready, R. C. (2002) *Valuing Cultural Heritage: Applying Environmental Evaluation Techniques to Historic Buildings, Monuments and Artefacts*, Edward Elgar, Cheltenham.

Nunes, P. A. L. D. and Schokkaert, E. (2001) Warm Glow and Embedding in Contingent Valuation, Nota di lavoro, 73, Fondazione Eni Enrico Mattei, Milano.

Nunes, P.A. L. D., van den Bergh, J. and Nijkamp, P. (2003) *The Ecological Economics of Biodiversity: Methods and Policy Applications*, Edward Elgar, Northampton.

Schläpfer, F. (2006) Survey Protocol and Income Effects in the Contingent Valuation of Public Goods: A Meta-analysis, *Ecological Economics*, 57, 3, 415-429.

Van der Laan, P. and van Tuinen, H. K. (1996) *Increasing the Relevance of Income Statistics: Experiences and Plans in the Netherlands*, Paper presented at the Expert Group on Household Income Statistics, Luxembourg Income Study, Canberra.

Venkatachalam, L. (2004) The Contingent Valuation Method: A review, *Environmental Impact Assessment Review*, 24, 1, 89-124.

Verbič, M. (2004) *Economic Aspects of Spatial Values in the Process of Coordination of Developmental Interests and Protection Requirements: Construction, Analysis and Evaluation of Methods for Economic Valuation of Spatial Values*, Institute for Economic Research, Ljubljana.

Verbič, M. and Slabe Erker, R. (2004) *Guidelines for Economic Valuation of Natural and Cultural Heritage*, Institute for Economic Research, Ljubljana.

Verbič, M. and Slabe Erker, R. (2005) *Economic Aspects of Spatial Values in the Process of Coordination of Developmental Interests and Protection Requirements: Application of Methods for Economic Valuation of Spatial Values to the Landscape Development and Protection Area of Volčji Potok*, Institute for Economic Research, Ljubljana.

Verbič, M. (2006) Analysis of Stated Preferences as an Approach to Economic Valuation of Environmental Values and Natural and Cultural Heritage, *IB Review*, 40, 1-2, 21-36.