

ECONOMIC EVALUATION OF RECREATION - COMPARISON OF THE TRAVEL COST MODEL (TCM) AND THE CONTINGENT VALUATION METHOD (CVM)

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***Abstract:** Tourism that takes place in nature sites benefits from the fact that nature is considered to be a public good. There is no fee charged for being in nature and using nature for recreational purposes. Prevailing nature-based tourism destinations are admission free. To evaluate the economic value of recreation, various methods for valuation of environmental goods are commonly used. The most widely used methods are the travel cost method and contingent valuation method. This paper focuses on comparison of these two methods. It discusses tourists' travel costs to get to a nature-based destination. It studies direct costs to get to a destination place and related indirect costs, including the time costs. To measure the economic value by using the contingent valuation approach, the Willingness-to-pay method is used. The Willingness-to-pay method measures the consumer surplus tourists have from their recreation (indirect economic value). The direct economic value is measured by expenditures incurred by tourists in the destination place. The comparison of both the approaches is applied to the tourists' survey data collected in a prime nature-based destination – National Park Podyjí.*

***Keywords:** Economic Valuation, Recreation, Travel Cost Model, Contingent Valuation Methods, Willingness to Pay.*

***JEL Classification:** Q51.*

Introduction

Nature-based tourism has an increasing tendency [8]. It accounts for 50 % of all international tourism in Europe and has been increasing in the range between 10-30 % per year, with global spending increasing on average by 2% per annum [1]. The increasing role of tourism is justified by defining national parks as tourist destinations, however tourism may also interfere with declared ecological goals, and increasing disagreements over the use of parks may arise [18].

In recent years the role of protected areas in society has been re-evaluated. The cost of preservation competes with public needs, and the increasing demand for land and sources imposes pressure on governments [19]. Parks often supply the most important part of the nature-based tourism, and yet the experience captures very little of its economic benefits. Most protected areas charge low entrance fees and these revenues cover only a part of the costs of management. Consequently, government lacks hard fiscal evidence to justify the allocation of public funds to park management, despite its importance to tourism [19]. Nevertheless, nature-based tourism is considered to be an appropriate economic development source in national park territories [6].

1 Problem description

Nature parks provide valuable services to people, including tourists. From an economic point of view, these services have two important features. The first one is that the economic value of these services depends on characteristics of the natural resource system. The second one is that access to the resources for recreation is typically not allocated through market channels [11]. Evaluation of natural resources makes a challenge in many respects. One of them is that non-market valuation is distinct from the neoclassical theory [10]. Price reflects aggregate societal values for market goods but non-market goods lack an analogous indicator of value [4].

Valuing environmental amenities, such as recreation or nature, can be done through several approaches. The most frequently used methods for evaluation are the travel cost method and the contingent valuation method.

The purpose of this paper is to compare the travel cost method and the contingent valuation method. The study is conducted in the national park Podyjí.

1.1 Travel Cost Model (TCM)

The Travel Cost Method is often used to measure benefits provided by access to public recreation sites [13]. The TCM deduces value from observed behaviour. The technique assumes that changes in total travel costs are equivalent to changes in admission fee. Nevertheless, it assumes that travel costs are proportional to the distance travelled by tourists [6]. The TCM is applicable only for domestic tourists, as in international tourism this assumption is not relevant [14]. Another limit of the TCM is that it is not possible to apply this approach in many undeveloped regions of the world in an advantageous manner [7]. The TCM is based on the principles that travel cost is an expense incurred by people visiting a site and that a greater distance from the site effectively raises the price of access [20]. Hof and King challenged this approach because it is not only travelling costs that influence consumer behaviour. Consumer behaviour is also influenced by on-site costs. They proposed an on-site cost model. For modelling the demand function, they replaced the ‘number of trips’ variable with the ‘number of days spent on site’ variable [9].

There may be distinguished three ways to apply the TCM: zonal model; individual model; and random utility model. The zonal model can most easily value the entire package of recreational services produced by the site. It is typically applied by collecting data on visitation patterns to the site from a number of different market areas. The individual model uses the same economic principles as the zonal model, but it analyses visitor data rather than averaging data from different origin zones. Finally, the random utility models (RUM) are the most extensive and powerful tools from travel cost models. They are designed to estimate benefits for site characteristics of quality, rather than for the site as a whole or particular trip [20]. A travel cost RUM model considers an individual’s discrete choice of one recreation site from many possible sites on a single choice occasion in a season [16].

Another way to sort the TCM approach is to differ between single-site models and multi-site models. The above mentioned RUM model is widely used for multi-site models. The single-site approach is useful to estimate the total use or “access value” of a site. It is a demand model for a trip to a recreation site by a person over the season [16].

An advantage of TCM is that the method is based on tourists' actual behaviour in actual conditions, rather than on what people say they would do under hypothetical conditions. The results are easy to calculate, explain, interpret, and apply. A limitation of the TCM is the assumption that tourists perceive and respond to change in travel costs in the same way as they respond to changes in admission fee. It assumes that individuals make a trip for a single purpose. If a trip has multiple purposes, the value of the site is overestimated. The respondents recall may be inaccurate [12] as well.

1.2 Contingent Valuation Method (CVM)

The contingent valuation method first came into use in the early 1960s when economist R.K. Davis used questionnaires to estimate benefits of outdoor recreation [15]. The contingent valuation method is the most widely used tool for attaching monetary values to enhancing, preserving or restoring resource amenities [7]. Contingent valuation methods were originally proposed by Ciriacy-Wantrup in 1947 who estimated side effects of soil erosion [21]. The CVM, including willingness-to-pay (WTP) or willingness-to-accept (WTA) determines and estimates consumer surplus. It was proved in several studies that the WTA values are higher than WTP values, and therefore WTA is not a good measure for consumer surplus [21]. Testing CVM results alongside the economic theory should create two conditions. Firstly, the percentage of respondents willing to pay a particular price should fall as the price increases. Secondly, the percentage of respondents willing to pay a particular price should increase as the demand for goods increases [3]. The WTP is influenced by many factors. Income usually has a positive and significant effect on WTP, whereas age has a negative effect. The value of WTP is also influenced by the information respondents receive. Respondents should have proper information about the evaluated object [16].

An advantage of CVM is that it is a widely used method for estimating the total economic value and consumer surplus. Interpretation of CVM studies is easy to understand, analyse, and describe. Monetary values can be presented in terms of the mean value per capita or per household, which can be easily aggregated to total values for the concerned population. Even though CVM has been popular for years, controversy remains over whether it really measures people's willingness to pay or to accept. The problems may emerge if respondents are not aware of the good or service they are supposed to evaluate. Misunderstanding between the surveyor and the respondent may rise up when the respondent answers a different question than the surveyor originally intended. Strategic bias may occur when a respondent supplies a biased answer with the intent of affecting a particular outcome [12, 20].

The elicitation technique used in CV studies can be divided into four main categories: bidding game, payment card, open-ended and dichotomous choice. The dichotomous choice can be further divided into two types: single-bounded (take-it-or-leave-it) choice and double-bounded dichotomous choice (take-it-or-leave-it with follow up). An extended version of double-bounded dichotomous choice, the triple-bounded dichotomous choice, has also been used in some studies [21].

These categories have evolved through practical application. Until recently, the oldest and most widely used technique was the bidding game [15]. Bidding game has been used in many research projects. The advantage of these methods can be viewed as providing better results than market-like situations, and the researcher can obtain a maximum

willingness-to-pay value. The problems associated with the bidding game method are higher costs (the interviewers have to be present) and the determination of a starting point [11].

The payment card approach was developed by Mitchell and Carson for estimating national freshwaters benefits in 1984. The payment card approach contains a range of WTP values for the public facility in question, from which individuals have to choose their maximum WTP value [21].

The open-ended technique involves asking what maximum price the respondents would be willing to pay. This method leads to a number of zero responses or protest bids because the respondents may find it difficult to answer the question or provide truthful answers [5].

Addressing this issue, Bishop and Heberlein developed the single-bounded (take-it-or-leave-it) method in 1979. In this method, the respondents are asked only “yes” and “no” questions to the bid [12]. The modified approach double-bounded choice (also known as take-it-it-or-leave-it with follow up) was introduced by Hanemann in 1984. This approach involves assigning one more bid to the initial bid. This approach is statistically more efficient than the single-bounded dichotomous choice and overcomes the inefficient nature of standard take-it-or-leave-it offers. There is only one follow-up recommended [15]. Despite the increasing efficiency of double-bounded questions, the anchoring effect may reduce the usefulness of this question format. Multi-bounded questions, however, may reduce the anchoring effect but are not ready for policy analyses because of their experimental status [2].

2 Methods

The comparison of both the methods was based on a tourists’ survey in NP Podyji. Focusing on the TCM, two models were analyzed. Firstly, the individual model TCM I involving only travel costs for getting to the area. TCM II extends the previous model and includes the time costs for getting to the area. The time costs are measured as a coefficient of time needed for transportation and the average hourly salary. The average hourly salary data refers to the Czech Statistical Office’s statistics, published for the studied period (CZK 145.80). To analyse CVM, the willingness-to-pay approach is used. The double bounded question with follow up is used to reveal the tourists’ preferences. Analysing the tourists’ expenditures, the travel costs related to the location are taken into consideration.

2.1 Studied Area

NP Podyji, the smallest national park in the Czech Republic (63 km²), was established on 1.7.1991. It covers the canyon of the Dyje river, with deeply incised meanders, cliffs and stone seas, the last well-preserved river valleys in Central Europe.

2.2 Data Collection

The tourists’ survey was conducted in 2011 (June – September) in the predetermined locations in the NP Podyji, to ensure the data reliability. In order to avoid any possible misunderstanding, face-to-face interviews were conducted. The interviewer made sure that the respondent was familiar with the subject to be evaluated and had a good understanding of what to expect in the visited area. Tourists without proper knowledge of the valued subject were excluded from the interviewing.

The questionnaire was divided into 3 main parts. First, screening questions were used to introduce the interview. The respondents were asked about their motivation to come to the NP Podyji, frequency of their visits, and the length of their actual stay. They were also asked about their residency.

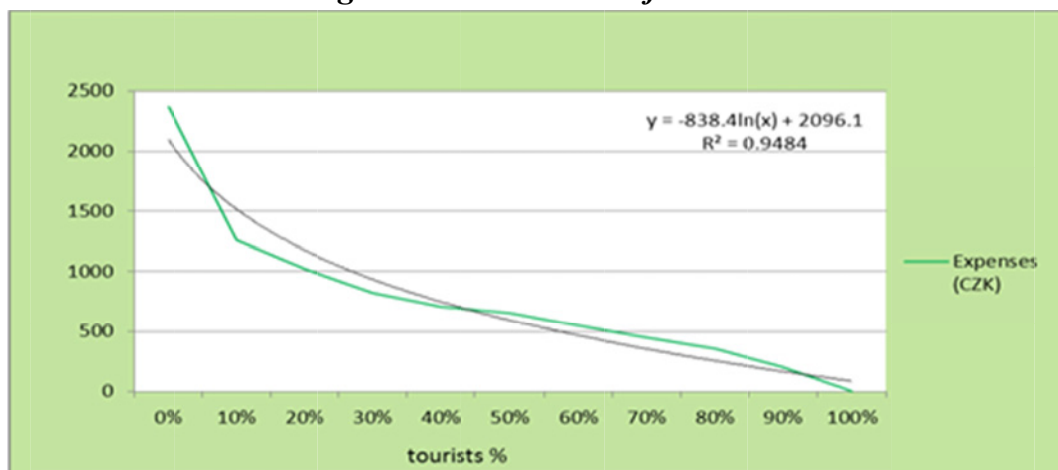
Second, respondents were asked about their costs spent during their stay, including spending on accommodation, board, transportation, souvenirs, gifts, and information materials (such as maps). Before asking valuation questions, respondents were again ensured that the survey would serve for academic purposes only. To evaluate their stay, respondents were asked the question: “What maximum amount are you willing to pay for being in this area and still having the same use from the visit?” The initial bid was CZK 100 per day. If the respondent declined, he/she was offered a second bid at a half of the initial amount. A similar process was applied if the respondent accepted the initial offer. In this case, they were offered the double amount of the initial bid. In addition, all respondents were asked what maximum amount they would be willing to pay.

Finally, a series of socio-economic questions were asked, including the respondent’s gender, age, educational level, type of occupation, number of family members, marital status and income. Altogether, 430 questionnaires were processed.

3 Problem solving

Tourists coming to the NP Podyji arrive mostly for recreation and being in nature (62.7%), followed by hiking (41.3%), and cycling (26.1%). Tourists usually come for two or three days (50%), in which weekend stays prevail. There are also quite many tourists coming for 1 day (23.0%) only. Tourists coming only for 1 day arrive mostly from the South Moravian region. Almost one half of tourists are on their first visit to the NP Podyji, 17.1% of tourists come several times a year, and only 6.0% of tourists come several times a month. Tourists are accommodated usually in guesthouses and camps. Only a small percentage of tourists are accommodated in hotel facilities.

Fig. 1: Tourist demand function



Source: Author

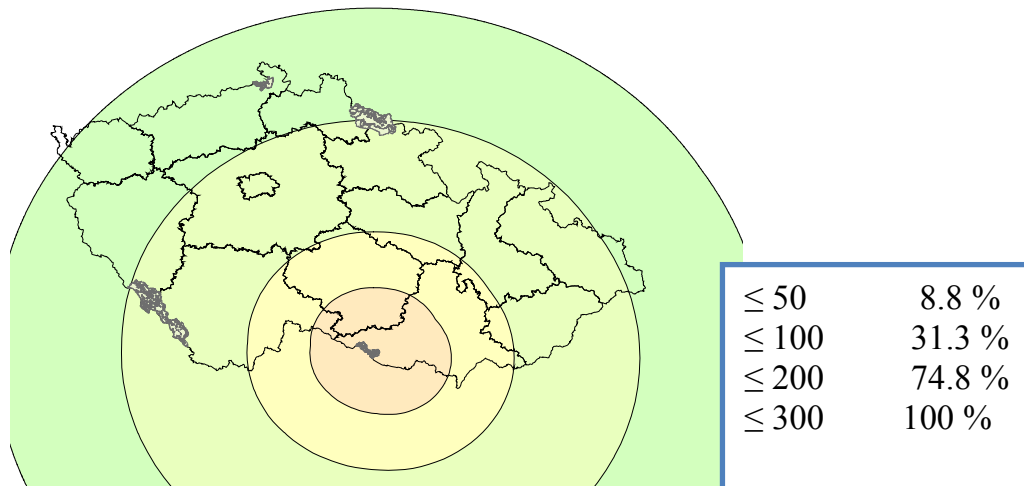
3.1 Travel Cost Model

Tourists coming for the NP Podyji come mainly from the South Moravian region (29.6%), followed by the Olomouc region (13.9%), Central Bohemia (11.3%), and Prague

(10.6%). The percentage of tourists coming from other regions of the Czech Republic is lower than 10.0%.

The average travel distance is 133.7 km. And almost three quarters of tourist come from the distance not exceeding 200 km. All tourists coming to the NP Podyji live in a distance not exceeding 300 km (see fig. 2). Standard deviation in travel distance is 66 km.

Fig. 2: Travel distance to the NP Podyji



Source: Author

Model I – direct costs: The travel costs per person for getting to NP Podyji are CZK 389.6 (mean), CZK 350.0 (median), standard deviation being CZK 298.1.

Model II – indirect costs (time costs considered): The tourists travel to the NP Podyji for more than two hours (mean 2.3 hours; median 2.4 hours). Taking into consideration the average wage in the studied period, then the time costs are CZK 335.3.

3.2 WTP approach

Direct economic value: Tourists spent on average CZK 2,306.9 per person on a trip in the NP Podyji. The highest expenses spent are on accommodation (38.2 %) and on board (29.3%). Considering foodstuff and board expenses together, these costs are slightly higher than spending on accommodation (40.6%). Detailed expenditures for the NP Podyji visits are shown in tab. 1. The average day expenditures are CZK 578.0 (not including the travel costs to the destination).

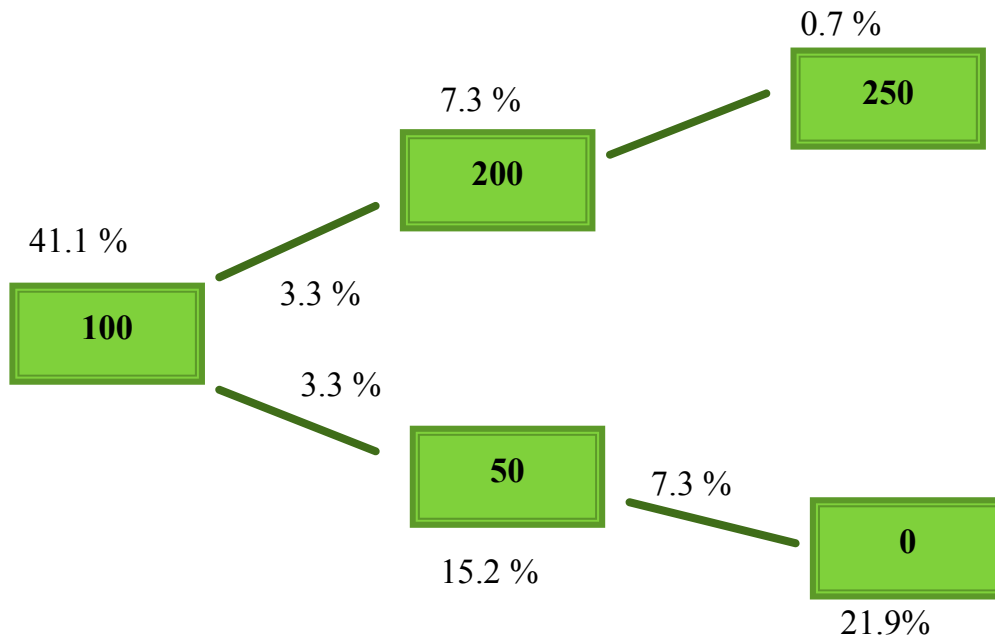
Tab. 1: Tourists' expenses

Board	676.5
Accommodation	881.5
Souvenirs, gifts	134.3
Entrance fee	198.1
Sport equipment rental	107.9
Foodstuff (not included in board)	260.4
Information materials (maps, etc.)	48.2
Total	2,306.9

Source: Author

Indirect economic value: The evaluation of indirect values shows that most interviewed tourists are ready to pay CZK 100 per day for admission fee. There are 66.9% of tourists willing to pay CZK 100 and less for admission fee. 21.9 % of tourists are not willing to pay any admission fee at all. Only 11.3 % of tourists are ready to pay more than CZK 100 per day (see fig. 3).

Fig. 3: Willingness to pay entrance fee (CZK per day)



Source: Author

The mean consumer surplus is CZK 100. Considering the cost per visit in the NP Podyjí and the consumer surplus, then the economic value is CZK 2,406.9. The economic value per 1-day trip is then CZK 678.0.

4 Discussion and conclusion

Comparisons of TCM and CVM show a higher economic value by using the CVM method. The evaluation of the recreation by using the TCM approach leads to the value of recreation in the NP Podyjí at an amount of CZK 633.4 (taking the time costs into consideration). Applying the WTP approach shows that the direct value of recreations expressed by tourists' spending on recreations in the studied area is CZK 2,306.9, not taking travel costs into consideration. Taking travel costs into consideration, the direct value of recreation would be CZK 2,696.5. The indirect value of the recreation determined by tourists' consumer surplus is CZK 678.0 per day spent in the studied area. These results might be influenced by a relatively short travel distance and the duration of stay (2-3 days). Nevertheless, it is necessary to refer to the limits of both the methods.

Even though the CVM shows a higher economic value, it is based on the respondents' actual feelings what they would do in certain circumstances. This would not have to be the same as if the situation came true. Their willingness to pay and their consumer surplus are influenced by other factors as well, not only by the recreation aspects. Tourists' consumer surplus of recreation may be also influenced by several personal issues, or other factors not related to the recreation purposes.

Travelling for a short distance, with relatively low travel costs, may raise one of the risks connected to the TCM: “How much are tourists influenced by travel costs in their decisions?” The same issue arises with regard to the time costs of travelling in connection with the TCM. More probably tourists will not use the time needed to get to the destination for earning money. They would rather consider this time to be used for other purposes than travelling.

Both methods have their advantages and limits. In this particular study, travel expenses do not make any significant share in total expenses of the trip. Therefore, the CVM method seems to be the most appropriate for this study.

Acknowledgement

Pieces of knowledge introduced in this paper resulted from solution of the institutional research project MSM 6046070906 “Economics of resources of Czech agriculture and their efficient use in frame of multifunctional agri-food systems” and the Internal Grant Agency (IGA) of the Czech University of Life Sciences in Prague, Registration Number 20121072.

References

- [1] BERZINA, I.; LIVINA, A. The Model on Estimating Economic Benefit of Nature-based Tourism Services of Territories of National Parks, Latvia. In *4th International Conference on Educational Technologies*. Corfu: Greece University, Corfu, 2008. pp. 100-105.
- [2] BOYLE, K.J. Contingent Valuation in Practice. In Champ et al. *A Primer on Nonmarket Valuation*. Netherlands: Kluwer Academic Publishing, 2003, pp. 111– 170.
- [3] CARSON, R. T, et al. Contingent Valuation: controversies and evidence. *Environmental and Resource Economics*. 2000, vol. 19, no. 3, pp. 173-210.
- [4] CHAMP, P.A. Collecting Survey Data for Nonmarket Valuation. In Champ et al. *A Primer on Nonmarket Valuation*. Netherlands: Kluwer Academic Publishing, 2003, pp. 59 - 98.
- [5] DESVOUGES, W. H., et al. Measuring natural resources damages with contingent valuation: test of validity and reliability. In HAUSMAN, J. A. *Contingent valuation: a critical assessments*. Amsterdam: North Holland, 1993. pp. 3-38.
- [6] DIXON, J.; PAGIOLA, S. Economic Analysis and Environment Assessment. *World Bank* [online]. 1998, 1, [cit. 2011-04-01]. Available from WWW: <<http://info.worldbank.org/etools/docs/library/37495/EAUpdateNo.23.pdf>>
- [7] DOUGLES, A. J.; JOHNSON, R. L. The Travel Cost Method and the Economic Value of Leisure Time. *International Journal of Tourism Research*. 2004, vol. 6, no. 5, pp. 365-374.
- [8] EAGLES, P. F. J., et al. *Sustainable tourism in protected areas*. United Kingdom: IUCN Publication Service Unit, 2002. 175 pp.
- [9] FONT, A. R. Mass Tourism and the Demand for Protected Natural Areas: A Travel Cost Approach. *Journal of Environmental Economics and Management*. 2000, vol. 39, no. 1, pp. 97-169.

- [10] FLORES, N.E. Conceptual Framework for Nonmarket Valuation. In Champ et al. *A Primer on Nonmarket Valuation*. Netherlands: Kluwer Academic Publishing, 2003, pp. 27-58.
- [11] FREEMAN, A.M. The Measurement of Environmental and Resource Values. *U.S.: Resources for the future*, 2003. 490 p.
- [12] HOROWITZ, J. K.; MCCONNELL, Kenneth. A review of WTA/WTP Studies. *Journal of Environmental Economics and Management*. 2002, vol. 44, no. 3, pp. 426-44.
- [13] KIM et al. *Estimating travel Cost Model: Spatial Approach*. [cit. 2011-04-01]. Available from WWW: <http://ageconsearch.umn.edu/bitstream/61774/2/Kim_050510.pdf>
- [14] LEE, C.; HAN, S. Estimating the use and preservation values of national parks' tourism resources using a contingent valuation method. *Tourism Management*. 2002, 23, pp. 531-540.
- [15] MITCHELL, R. C.; CARSON, R. T. Using surveys to value public goods. The contingent valuation method. *U.S.: Resources for the future*, 1989. 441 p.
- [16] PARSON, G.R. The Travel Cost Model. In Champ et al. *A Primer on Nonmarket Valuation*. Netherlands: Kluwer Academic Publishing, 2003, pp. 261 – 330.
- [17] PEK, C., et al. A Contingent Valuation Estimation of Hill Recreational and Services Values in Malaysia. In *MPRA conference* [online]. Munchen: MPRA, 2010 [cit. 2011-04-01]. [cit. 2012-06-30]. Available from WWW: <http://mpra.ub.uni-muenchen.de/23125/1/MPRA_paper_23125.pdf>
- [18] PUHAKA, Rikka. Increasing role of tourism in Finnish national parks. *Fennia*. 2008, vol. 13, no.1, pp. 47-58.
- [19] WALPOLE, M. J, et al. Pricing Policy of Tourism in Protected Areas: Lessons from Komodo National Park, Indonesia. *Conservation Biology*. 2001, 15, 1, pp. 218-227.
- [20] WARD, F. A. Environmental and Natural Resource Economics. US: Pearson Prentice Hall, 2006. 610p.
- [21] VENKATACHALAM, L. The contingent valuation method: a review. *Environmental Impact Assessment*. 2004, vol. 24, no. 5, pp. 89-124.

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Received: 31. 08. 2012

Reviewed: 08. 11. 2012

Approved for publication: 04. 04. 2013