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TECHNIQUES OF ECONOMIC VALUATION OF ENVIRONMENTAL GOODS

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Abstract: *Many companies in the environmental goods sector are interested in creating "added value". When looking at the viability of investing in production, companies starting out the production in the environmental goods sector should research production costs as well as consumer demand for new environmental products. Although the costs of environmental goods production can be roughly estimated, estimating consumer demand is a complex process. Questions related to determining the price of a new environmental goods product, the level of demand, the target segment and identifying consumer needs, which are inevitably present when introducing a new product to the market, represent the starting point for creating an adequate marketing strategy. This paper aims to explore the techniques of economic valuation of environmental goods as well as the concept of "Willingness to pay" for environmental goods or services. The paper shall analyze two basic groups of economic valuation techniques: revealed preferences techniques (RP), which observe consumer behavior and their choices on the real market, and stated preferences techniques (SP).*

Key words: *economic valuation, environmental goods, willingness to pay, revealed preferences, stated preferences, organic products*

JEL classification: *D12, C40*

TEHNIKE EKONOMSKOG VREDNOVANJA EKOLOŠKIH DOBARA

Sažetak: *Mnoga preduzeća u sektoru ekoloških dobara zainteresovana su za stvaranje „dodate vrednosti“. Kada se posmatra održivost ulaganja u proizvodnju, preduzeća koja započinju proizvodnju u sektoru ekoloških dobara treba da istraže troškove proizvodnje, kao i potražnju potrošača za novim ekološkim proizvodima. Iako se troškovi proizvodnje ekoloških dobara mogu grubo proceniti, procena potražnje potrošača je složen proces. Pitanja koja se odnose na utvrđivanje cene novog ekološkog proizvoda, nivoa tražnje, ciljnog segmenta i identifikovanja potreba potrošača, koja su neizbežno prisutna prilikom uvođenja novog proizvoda na tržište, predstavljaju polaznu osnovu za kreiranje adekvatne marketinške strategije. Ovaj rad ima za cilj da istraži tehnike ekonomskog vrednovanja ekoloških dobara kao i koncept „spremnosti da se plati“ za određena ekološka dobra ili usluge. U radu se analiziraju dve osnovne grupe tehnika ekonomskog vrednovanja: tehnike otkrivenih preferencija (RP), koje posmatraju ponašanje potrošača i njihov izbor na stvarnom tržištu, i tehnike iskazanih preferencija (SP).*

Ključne reči: *ekonomsko vrednovanje, ekološka dobra, spremnost na plaćanje, otkrivene preferencije, iskazane preferencije, organski proizvodi*

1. INTRODUCTION

Many companies in the environmental goods sector are interested in creating "added value". When investing in production, companies should research production costs as well as consumer demand for new environmental products. Although the costs of environmental goods production can be roughly estimated, estimating consumer demand is a complex process. The research highlights the importance of economic valuation methods in the non-market valuation procedure of ecological resources and generally in the field of environmental goods and services that are newly introduced on the market. There are two basic groups of non-market valuation techniques: revealed preferences (RP) techniques, which observe consumer behavior and their choices in the real market and stated preferences (SP) techniques, which are used to elicit individual expressed preferences in relation to hypothetical alternatives.

The fact is that consumers are more and more familiar with the principle of food safety and are ready to pay a higher price for environmental products that are healthier and more nutritious because they believe that this reduces the health risk. The concept of "Willingness to pay" (WTP) appeared in the economic literature more than a century ago primarily for the purpose of forming prices for

public and environmental goods and services. Willingness to pay expresses the maximum amount elicited to determine how much a consumer is willing to pay for a particular good or service unit. According to the authors of Briedert, Hahsler and Reutterer (2006) the concept of willingness to pay for a product or service is used when formulating competitive strategies, conducting value audits and developing new products.

Many methods for eliciting WTP have been presented in the scientific literature. This paper aims to explore the techniques of economic valuation of environmental goods as well as the measurement of the concept of "Willingness to pay" for certain environmental goods or services. The paper analyzes two basic groups of economic valuation techniques: revealed preferences techniques (RP), which observe consumer behavior and their choices on the real market, and stated preferences techniques (SP).

2. TECHNIQUES FOR ECONOMIC VALUATION OF ECOLOGICAL GOODS

Revealed preference techniques deal with consumer choices in order to analyze consumer preferences. Stated preference techniques analyze the consumer choices made under experimental conditions through which they directly expressed their preferences. Presentation of techniques for the economic valuation of environmental goods and services is shown in Figure 1. Authors Kostić and Rodić (2012, p. 664) state that the "group of revealed preferences techniques includes the method of defensive behavior, hedonic pricing, the method of travel costs and the method of random utility".

On the other hand, hypothetical choice modeling, contingent valuation method (CVM) and conjoint analysis are included in the category of stated preferences.

The basis of the method of defensive behavior lies in the fact that market goods can, under certain conditions, play the role of a substitute for lost environmental goods. The advantage of this method is that it does not require a lot of data, can be applied quickly and can provide relatively accurate values that correspond to the real situation. However, it is not always reliable, especially if all other important aspects of consumer behavior that accompany decision-making are lost.

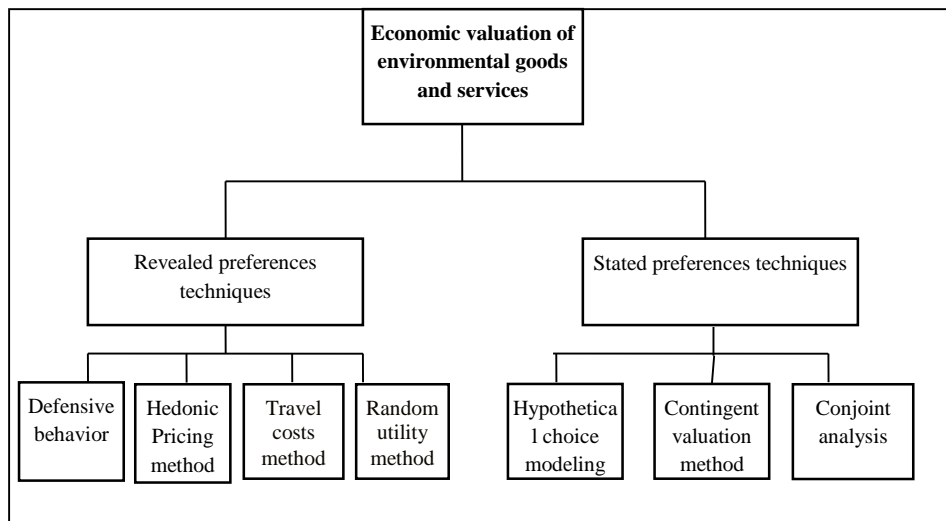


Figure 1. Graphical presentation of techniques for economic valuation of environmental goods and services

Note. Authors elaboration.

Hedonic pricing includes an analysis of those markets where environmental factors have an impact on the price. By using appropriate statistical techniques, the hedonic approach can:

- a) identify how much of the price difference comes from environmental factors and
- b) how much people are willing to pay to improve the quality of the environment.

The method of travel costs is based on the fact that the value of natural resources can also be seen through travel costs, while this method can only determine the value of use, i.e. use of ecological goods. The method of random utility indicates the consumer's choice between two or more goods with different ecological characteristics.

One of the advantages of the stated preference technique, which the authors Lee and Hatcher (2001) point out, is that it is precisely with this technique that researchers can understand how consumers react to new goods and services and to predict demand in conditions in which market data on new goods and services are still are not available. On the other hand, according to the authors Mitchell and Carson (1989), the contingent valuation method, of the stated preference technique, is a research-based approach that attempts to create a hypothetical market for a certain environmental good or service, constructing a scenario in

which respondents determine the amount they would pay to acquire the hypothetical good or service, specified in the questionnaire. Hanemann (1984) states that different methodological approaches can be used to evaluate the willingness of consumers to pay for a certain good, and the contingent valuation method is one of them. Carson and Hanemann (2005, p.824) point to the useful information that in the literature on the economics of environmental protection, the mentioned method has become known as "contingent valuation", as an estimate of "valuation" obtained on the basis of preferential information, given that it represents a "contingent" valuation of an environmental good within the "constructed market for research purposes". Šomodi (2011, p. 66) defines the contingent valuation method as "a method that tries to express monetarily the availability or individual preferences of given goods or services." Researchers typically want to determine whether people are willing to pay for certain goods or services at a given price, or which goods or services they will prefer to purchase given a possible choice.

Martínez-Carrasco, Brugarolas, Martínez-Poveda and Ruiz-Martínez (2015) point out that this method is indeed one of the most commonly used methods for determining the willingness to pay (WTP) in empirical studies, because it is flexible and easier to apply than other experimental methods. On the other hand, Lee and Hatcher (2001) point out its shortcomings, such as overestimating the willingness to pay, insufficient familiarity with a certain good, and inconsistency between closed and open types of answers.

Hypothetical choice modeling involves a spectrum of several different techniques that have in common that instead of asking the respondent to express WTP precisely, they require that the offered alternatives be ranked, which indirectly leads to the determination of WTP.

The classification of Merino-Castelló (2003) has divided the stated preference technique into two subgroups (Figure 2): Contingent valuation (CV) and valuation based on multiple attributes (multi-attribute valuation - MVA). This author states that the measurement of consumer preferences should make it possible to quantify individual economic evaluations or willingness to pay (WTP), because these economic evaluation techniques are not only applied as an instrument for making decisions related to public policies, but also as marketing research techniques.

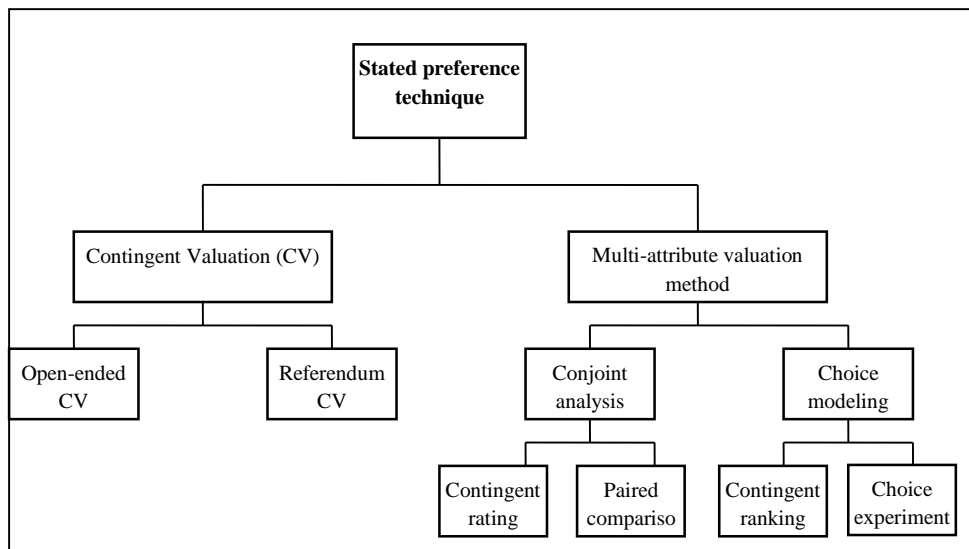


Figure 2. Graphical presentation of techniques of stated preferences

Note. Merino-Castelló, A. (2003). Eliciting Consumers Preferences Using Stated Preference Discrete Choice Models: Contingent Ranking versus Choice Experiment. *UPF Economics and Business Working Paper*, 705.

3. THE DYNAMICS OF ECONOMIC GROWTH AND INVESTMENT ACTIVITY OF THE REPUBLIC OF SERBIA IN THE SECOND DECADE OF THE 21ST CENTURY

There are various research methods for collecting the data on the willingness to pay (WTP). Although the contingent valuation method has primarily been used for the monetary assessment of consumer preferences for non-market goods (eg natural resources), authors Gil, Gracia and Sanchez (2000) state that it is often used in the scientific literature in the context of consumers' willingness to pay for organic products, bearing in mind that the organic market is still "underdeveloped" and organic products are not available in all retail stores. Defrancesco (2007) confirms in his work that the method of contingent valuation is widely applied, both in the valuation of non-marketable goods and in the assessment of the premium for new or differentiated marketable goods.

Although the contingent valuation method has traditionally been used to determine the value of public goods that do not have a fixed market price, such as environmental goods, its use has been extended to determine the willingness to pay (paying a premium price for the added value function of the product) for

organic food products. Many authors in their scientific research works use this method to determine the willingness to pay (WTP) for organic products (Jolly, 1991; Gil, Gracia & Sanchez, 2000; Krystallis & Chryssohoidis, 2005; Batte, Hooker, Haab & Beaverson, 2007 ; Rodríguez, Lacaze & Lupin, 2007; Muhammad, Fathelrahman & Ullah, 2015; Sriwaranun, Gan, Lee & Cohen, 2015). In the Republic of Serbia, the consumers of organic products expressed the WTP up to 20%, on the price of conventional products, for the organic produce (Vapa Tankosić, Ignjatijević, Kiuriski, Milenković & Milojević, 2020; Vapa Tankosić, Ignjatijević, Kranjac, Lekić & Prodanović, 2018). Choosing an appropriate method for valuing willingness to pay is crucial for determining optimal pricing policies or for assessing demand for new products. The contingent valuation method is used to measure various aspects related to organic products, such as better health, quality and taste or product risk. Boccaletti and Nardella (2000) point out that the contingent valuation method enables a direct estimate of the WTP, which is obtained using different techniques for eliciting WTP. The consumers should indicate their willingness to pay (WTP) without purchasing a hypothetical product. With this method, the consumer is directly asked to declare the highest price that he/she would pay for one unit of a certain good or service.

Interactive interviews, as well as telephone and postal surveys, are used in numerous studies. There are various methods for eliciting consumer WTP, such as the dichotomous choice format (question asking willingness to pay \$X for a good, yes or no, open-ended questions, bidding, ranking). Another way is for the consumer to determine a premium that seems acceptable to him through a payment card on which price premiums are already listed. Hoyos and Mariel (2010) point out that the most frequently applied questionnaire formats for measuring WTP are direct (open) questions, dichotomous (discrete) choice, bidding games, payment card system, referendum question format. In the questionnaires for evaluating the willingness to pay more for organic products, the method of contingent evaluation with dichotomous choice questions and the payment card system has been used. Very often, through a dichotomous choice question, consumers were asked to answer whether they are willing to pay a higher margin for organic products, and then they will indicate their willingness to pay a higher margin using a payment card system (5%, 10%, 15% and 20%).

4. CONCLUSION

The method of contingent valuation within the stated preference technique is successfully applied to research on the determinants of demand of environmental goods products. For the purpose of conducting research by employing these techniques the, attention should be paid first to the creation and design of

questionnaires. The questionnaire itself needs to be tested with a pilot study in part of the sample in order to ensure that the respondents understand the context of the research. After that, it is necessary to test the reliability and validity of the questionnaire. The empirical research should include the collection of data and information using the survey method, statistical analysis using selected statistical methods and testing the significance of research results.

As a growing number of consumers in our country are willing to pay for environmental goods further research on the topic can help all interested stakeholders in creating an appropriate strategy for pricing these products on the market. Potential imitations in the applying this method, regard the conditional elicitation of willingness to pay (for research purposes), that can be overestimated because the consumers, during the survey, do not take into account all the factors that they take into account during the actual purchase or other important aspects of consumer behavior that accompany the decision to buy environmental goods.

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