# WATER ATTRACTIONS AND THEIR PRICE ELASTICITY OF DEMAND: DESCRIPTION OF RESEARCH

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**Abstract**

Emphasize of this paper is to describe attributes of observed objects in nature, particularly parks. Parks has unique features (both public and private goods, depending on ownership) that individual consumers evaluate differently than public goods. As empirical research shows, there is usually weaker elasticity of willingness to pay for public goods than for economic consumption (Green, 1992). Parks are either human-made, private or natural, public. For the latter one, a human being is only a guard and user. Water attractions in parks with unique features are described by company providers, consumers, or society as a whole. A description of such an object is essential for any analysis. The conjoint analysis offers many tools to comprise consumers` and societies` evaluation of utility. This paper is matching the preparation for primary data collection in order to carry out the conjoint analysis. Objects for description are particular goods as parks undoubtedly are. The descriptive method is combined with a literature review. This pilot study is the basis for research that will combine goods description and conjoint analysis leading to price elasticity coefficients of demand. The review of the research is a necessary starting point for the future application of conjoint analysis.

**Keywords:** elasticity, public goods, sustainability in regions

**JEL Code:** D12, D41, R22

## Introduction

Clearwater for everyone. A simple statement is not easy to achieve in an era of hardships. Stimulation of behaviour that preserves clear water for everyone is a goal addressed globally. Tools of economic analysis deal with sustainability problems related to water management. Observing the preferences of people towards clearwater can enhance sustainability. A decomposition of the preferences provides insight into consumption patterns, such as drinking or cooking, in bathing and cleaning. These use methods primarily complement each other

under the assumption that there is sufficient stock or water delivery. In a case where water is very scarce, uses are competing.

Nonetheless, a consumer always has a structure of preferences. This paper lets aside the use for drinking or cooking as well as cleaning and gardening. Emphasis is given on relaxation, bathing in artificial and partly natural water attractions. Paper wishes to examine if consumers are sensitive to price. Moreover, the paper points out how much pollution or level of clear water explain a part of the consumers` demand function for relaxation. That shall shed light on the sustainability of water attractions used.

# 1      Review of the existing research

Price or entrance fee influences a choice for natural attractions. Often as some cases suggest, it is necessary to pay for attractions. For example (Reynisdottir et al., 2008) examined the introduction of entrance fees to natural attractions. In order to excuse the existence of a fee, it is mentioned a threat of inadequate public funds for site maintenance and management.

Demand function can be driven based on variables as income, country of residence, age and education, preferences of tourists. Preferences of tourists can reflect a positive or negative attitude towards environmental protection, previous visits, history of paying entrance fees, and willingness to pay a fee (Alexandros & Jaffry, 2005; Reynisdottir et al., 2008). Implementation of demand management strategies is suggested. As results of existing scientific literature show, there can be higher sensitivity to entry fee fluctuations than different attractions.

In the realm of entry fees for marine parks (Pascoe et al., 2014), fees are not expensive, and many marine reserve managers impose an entry fee. The findings show that the price elasticity of demand in the analyzed region is highly inelastic. Increasing the cost of diving through a management levy would have little impact on total diver numbers. This implication is essential information because dive tourism is the source of significant income in some countries. The lack of funds is often a problem of marine parks (Peters & Hawkins, 2009) discussed by (Reynisdottir et al., 2008). That is why authors (Peters & Hawkins, 2009) focused on introducing fees and increasing those where charges have already existed. They confirmed the positive influence of fees on demand. Factors that caused a positive impact include visitors' income, level of education, environmental awareness, residency, and desire to provide a legacy to future generations.

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**Tab. 1: Overview of the empirical literature findings**

| Author | Focus of research | Method | Analyzed period | Analyzed area | Findings |
|---|---|---|---|---|---|
| Alexandros & Jaffry, 2005 | Tourists` willingness to pay a fee. | Logit estimations | N/A | Greece | Demand can be more sensitive to entry fee fluctuations. |
| Cain & Meritt, 2007 | Demand for zoos and aquariums. | Regression analysis | 2004-2005 | USA | Demand for zoos and aquariums is price inelastic. |
| Green, 1992 | The elasticity of economic consumption goods and public goods. | Logit estimations | 1989-1990 | USA | Political goods are less price-elastic than economic consumption goods. |
| Larnyoh & Awunyo-Vitor, 2016 | Demand for recreation at the zoological garden. | Regression analysis | 2009 | Ghana | Visitors are willing to pay a higher amount to enjoy the services of the zoo. |
| Pascoe et al., 2014 | Impact of entry fees for marine park on tourism. | Cost analysis | 2010 | South-East Asia | The price elasticity of demand is highly inelastic. |
| Peters & Hawkins, 2009 | Lack of funds of marine parks. | Contingent valuation method | 2004 | Caribbean/Gulf of Mexico, south-east Asia, Indian Ocean, Pacific and the Mediterranean. | The authors confirmed the positive influence of fees on demand. |
| Poudyal et al., 2009 | The demand of the urban recreation parks. | Hedonic regression | 1997-2006 | USA | The demand for urban park acres was price inelastic. |
| Reynisdottir et al., 2008 | Entrance fees to natural attractions. | Contingent valuation method | June 2004 | Iceland | Fees would not significantly decrease the demand. |

Source: own summary.

Cities across the world combine several options for visitors. Options of spending time in visited cities include strolling through harbours, discovering the cultural heritage, admiring marine park exhibitions or being active in recreation parks. Mentioned can be summarised

under a group of urban parks; for example (Poudyal et al., 2009) analyzed demand for the urban recreation parks.

Their results indicate that demand for urban park acres was inelastic in price and income, and the park's size was a substitute for living space and proximity to the park. While (Larnyoh & Awunyo-Vitor, 2016) investigated demand for recreation at the zoological garden. The findings show that socioeconomic factors significantly influence demand. They proved the existence of consumer surplus (adult and student visitors). It means visitors are willing to pay a higher amount to enjoy the zoo's services than paid as gate fees. There was recommended an increment in gate fees for adults and students. Concerning the zoo demand (Cain & Meritt, 2007), demand for zoos and aquariums is price inelastic, particularly among non-for-profit institutions. They argue that, despite changes in income, population, leisure activities, and other variables that affect the quantity demanded, the demand structure has been stable. Based on Table 1, the demand elasticity ranges from elastic to inelastic. Such a range caught attention for finding distinguishing features or perceptions in the preferences of consumers. Such a distinction may serve for the optimization of fee strategies to steer behaviour in the desired way.

## 2    Methodology for paper

It is understood that the contingent valuation method, hedonic regression, and logit estimation were methods used frequently for measuring visitors' reactions to parks in general (see Table 1). This paper does not apply any of these methods, which is both a limitation and an advantage. The descriptive method is combined with a literature review above. The review allowed us to notice a gap in parks perceptions analysis.

A pilot study was focused on water attractions in the Czech Republic. Data collection was done during December 2020, although data refer to 2017-2020 for several water attractions in the Czech Republic. Manual data cleaning identified that most of the water attractions that visitors were referring to are located in Prague and its surroundings (Central Bohemian Region, abbreviated as CBR). Therefore the pilot study focused on data of respondents refereeing to CBR here. Namely it were water attractions: Aquapalace Prague, Miraculum, Aquacentrum Šutka, Aquacentrum Letňany, swimming pool Slavia, Jedenáctka, Aqua Sport Club and Podolí Swimming Stadium. The complete and most relevant data were considered only for the first three named water attractions and included 128 respondents with 1,280 observations. In particular, 35 respondents were reacting on data from 2017 (35 all data on

Aquapalace Prague), 55 respondents were reacting on data from 2018 (40 on Aquapalace Prague, 5 on Miraculum and 10 on Aquacentrum Šutka), 98 respondents were reacting on data for the year 2019 (77 on Aquapalace Prague, 5 on Miraculum and 16 on Aquacentrum Šutka). As for the year 2020 there were 68 respondents (58 on Aquapalace Prague, 3 on Miraculum and 10 on Aquacentrum Šutka). The rest of the data was cleared away.

The pilot study serves us to carefully prepare conjoint analysis where descriptions of products and pre-selection are required. Construction of decision-cards of products or services for conjoint analysis allows obtaining more accurate data leading to price elasticity coefficients of demand. This pilot study and its primary data are obtained only for people aged 20-30 years. However, it serves us to notice all popular water parks in this age group and for example (Green, 1992) showed that there are not usually significant differences in the responses of different age groups.

The review of the research is a necessary starting point for the future application of conjoint analysis. According to (Rao, 2014) conjoint analysis is correct to formulate a marketing strategy for a brand, making decisions on product's characteristics, communication, distribution, and pricing to chosen sets of targeted customers. For the company's success, there must include a clear understanding of how customers will choose among competing alternatives because consumers typically make trade-offs among the attributes of a product or service. The conjoint analysis belongs to the most robust set of techniques for studying customers' choice processes and determining trade-offs. One of the significant functions of conjoint analysis is to help manage price decisions. The application is connected with the determination of the optimal price for the product. The approach for optimal price determination is one where a price connected with the highest profit can be deemed the best price of the product. That is why this approach can be used to estimate price elasticity for the product. The price elasticity can be defined as the ratio of proportional change in sales to a proportional change in price (Mohn, 1995). It measures the elasticity with which consumers react to price changes (Macáková et al., 2019). The knowledge of price elasticity of demand is vital for companies. Price elasticity is a comprehensive factor of customer behaviour. The development of price elasticity of demand is related to company revenue development, and it is crucial to adjust price strategies (Macáková et al., 2019). As mentioned, price elasticity is the elasticity of a consumer's reaction to a change in price that affects the company's revenue. If the demand is price elastic, a drop in price means an increase in the number of goods consumed, and the company's income should increase; in this case, $|epd|>1$. When the

demand is price inelastic │epd│< 1, the reactions of costumers are less intense, and unitary elasticity of demand means that behaviour of costumers is changed in the same range as price changes, then │epd│= 1 (Macáková et al., 2019).

There is evidence that the elasticity of economic goods is investigated by conjoint analysis in the existing scientific research. For example, price sensitivity in sport was analyzed by (Ninomiya, 2015), who showed that ticket demand elasticity is relatively elastic for high-priced tickets and relatively inelastic for low-priced tickets. Then, findings of (Daniel & Johnson, 2004) using conjoint analysis suggest that prices of the membership packages could be raised considerably without any increased loss of customers. A segment of consumer products (Herbst & Burger, 2002) shows a high demand elasticity for jeans price changing. Therefore, marketers should be cautious about any price change.

## 3    Goods description and results on a pilot study for water attractions

Eight water attractions areas were selected in the pilot study. All attractions are in the Czech Republic and either in Prague or in its surroundings. The description offers nominal, ordinal, and categorical data for this small-scale sample.

1. Aquapalace Praha uses an area of 9.000 square meters, where toboggans and slides are located. To illustrate water use for relaxation: in paddling pools, pools with waves, artificial river, and whirlpool baths. It operates since 2008 with mainly indoor water attractions. 2. Miraculum water park is 10 hectares, so to say, a full-fledged park. Water entertainment is the main focus, especially for families. Miraculum is relatively further away, about 50 km away from Prague. 3. Aquacentrum Šutka operates since 2012 (note: its construction began in 1987) in its indoor pool, whirlpool, also river, and chutes. It is not completed fully (faces changes in its plans of construction), in any case. It is one of the most significant investments of Prague city. Aquacentrum Šutka is where price competition (as well as quality and variety of service) would be of the highest importance.

4. Aquacentrum Letňany it serves consumers since 2000. It provides a special offer for early morning swimming (discount). It provides an indoor pool, toboggan, and children's pool. 5. Swimming pool Slavia one indoor and one outdoor swimming pool and paddling pool. Again, historically coloured place of Slavia, meadow where it is located has served for sport and relaxation since 19ᵗʰ century. 6. Jedenáctka is named for a sports area with one pool and a second one with toboggan and relaxation services. It exists since 2014. The area is

approximately 3.000 square meters large with indoor and outdoor equipment that focuses on children's swimming training. 7. Aqua Sport Club is a place devoted to training and sport. Swimming pool hours are scheduled for different groups (for instance: pregnant women, children focused on water aerobics and gymnastics, athletes, club members, and the public), which emphasizes the unique needs of the consumers. Aqua Sport Club offers only indoor pools. 8. Podolí Swimming Stadium offers two indoor pools and one outdoor pool. It functions since 1965 in the place of a former quarry. Uses are manifold: pools for water polo, toboggan, and diving. It offers places for over 5000 spectators. Its history and architecture can be of particular interest and location near the Kavčí hory mountain range. It is a unique place itself. After obtaining data, four objects were rejected for insufficient data. Therefore, correlations found in Table 2 are limited to three parks with water attractions.

Data were subjected to the correlation analysis to detect a linear relationship between consumers' demand and the type of fees. The resulting correlation coefficients are statistically significant between basic fee, student fee, and consumers' demand in Aquacentrum Šutka. It seems that only Aquacentrum Šutka seems to have an opportunity for price strategy. The correlation coefficient value indicates that an increase in entrance fees should positively affect consumers' demand. Positive relation could reflect that Aquacentrum Šutka may consider lowering entrance prices for similar services as parks with higher prices in the location under examination. Alternatively, they may consider value packages for consumers. Again, the relation supports the fact that it could be linked to the fact that an increase in fees affected consumers' demand positively. Special offers and various discount promotions for consumers can significantly affect the linear relationship between variables (for example, 20 minutes free of charge for each entry).

The other correlation coefficients are not statistically significant; this means that co-movements of variables are not sufficiently robust. These results suggest that the level of fees should not primarily affect the demand of consumers. There could be different type of factors that motivate demand for analyzed parks. For example, an extra cost for transport, the attractiveness of the park, offered attractions, offered thematic programs for the weekend, transport accessibility of the park, a rich offer of other services (for example massages, beauty treatments), availability of restaurants and buffets in the park, marketing of park, the level of service quality perceived by consumers and many other creative services. Such creative services are a business secret and attract consumers.

**Tab. 2: Correlation coefficients between types of entrance fee to aquaparks and consumers demand**

| Aquapalace Praha | | | | |
|---|---|---|---|---|
| Fee//Year | 2017 | 2018 | 2019 | 2020 |
| Basic | 0.21 | 0.05 | 0.16 | 0.12 |
| Student | 0.24 | 0.04 | 0.17 | 0.12 |
| Family | 0.23 | 0.15 | -0.02 | 0.06 |
| **Aquacentrum Šutka** | | | | |
| Fee//Year | 2017 | 2018 | 2019 | 2020 |
| Basic | N/A | 0.01 | 0.46*** | -0.37 |
| Student | N/A | 0.00 | 0.53** | -0.36 |
| Family | N/A | 0.04 | 0.41 | -0.28 |
| **Park Mirakulum** | | | | |
| Fee//Year | 2017 | 2018 | 2019 | 2020 |
| Basic | N/A | -0.25 | -0.56 | N/A |
| Student | N/A | -0.23 | -0.79 | N/A |
| Family | N/A | -0.08 | -0.22 | N/A |

Source: own. Note: ** denote significance at 5 % level and *** denote significance at 10 % level.

## 4 Envisaged concept of further research

This pilot study aimed to suggest realistic attributes and levels for examination in conjoint analysis apart from preliminary results on the price demand relationship of the water attractions. Attribute number one is the entrance fee that shall include free entrance, especially natural water attractions and lakes. However, these (e.g. Jezero Konětopy, Probošská lakes, to name a few) could be considered a different product for the distance needed to travel. Distance is one of the attributes we will have to include in consideration. A problem arises from measuring distances because each consumer has a different living place, and thus distance is a more subjective factor. This fact is a reason why smaller regions have to be examined separately.

Attribute number three is pollution or the use of chemicals. As an example will serve us chemical-free swimming areas in Lhotka. It is a natural living pool. In line with what was written about attributes, we can suggest 12 profiles. Profiles from A to L can be combined from Table 3. The attributes are mixed: discrete (chemicals use), categorical (proximity to 50 km), and continuous (prices).

**Tab. 3: Suggested profiles for analysis**

| | | Proximity | | | |
|---|---|---|---|---|---|
| | | Close (within approx. 50 km) | | Far (more than approx. 50 km) | |
| | Pollution | Does use chemicals | Does not use chemicals | Does use chemicals | Does not use chemicals |
| Price | Basic | A | D | G | J |
| | Discount | B | E | H | K |
| | Packages | C | F | I | L |

Source: own.

Based on the attributes, we set the model as:

$$Y_i = U_1(X_{i1}) + U_2(X_{i2}) + U_3(X_{i3}) + Error \qquad (1)$$

$$i = 1, 2, ..., 12$$

where:

$U_1(X_{i1})$ level of proximity within the part-worth function for attribute A (proximity)

$U_2(X_{i2})$ level of pollution within the part-worth function for attribute B (pollution)

$U_3(X_{i3})$ level of price within the part-worth function for attribute C (price)

$Y_i$ rating in the $i$-th system

Rational consumers of water attractions would mostly prefer the following profiles: A, B, C over D, E, F. The proximity could dominate over pollution and price.

## Conclusion

The pilot study provided us with the information necessary to understand the relation between entrance fees for attractions and consumers' demand. This understanding is essential for the future application of conjoint analysis and its entrance attributes. The findings of existing empirical literature show the demand elasticity ranges from elastic to inelastic. Such a range caught attention for finding distinguishing features or perceptions in the preferences of consumers. This review allowed us to notice a gap in parks perceptions analysis. Therefore, our pilot study focused on analyzing selected water parks based on data obtained by people aged 20-30. The correlation analysis on our dataset shows that the types of fees should not primarily affect consumers' demand. It means that attributes as cost for transport, offered

attractions, marketing of park can affect consumers demand. Their use in research with conjoint analysis methods can provide important information, mainly for managing the parks and other attractions. The information could be used to estimate consumers' demand for attractions, which could help management make business decisions and strategies.

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