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Economic Valuation of Cultural Heritage: Application to a museum located in the Alto Douro Wine Region– World Heritage Site

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Abstract: Cultural assets are increasingly being considered in the policies of social and economic development of territories due to spillover effects. However, since cultural assets are not transacted in the market, their use value should be calculated using indirect methods of evaluation or non market techniques. In this paper, the travel cost method was chosen to estimate the curve of demand in the Museum of Lamego which constitutes an important cultural item of the Alto Douro Wine Region, classified by UNESCO in 2001, as a world heritage site – a living and evolving cultural landscape. The results of the application of the Poisson model confirm the expected, that is, the probability of visiting the museum is positively influenced by the educational level, female gender and negatively by the travel cost.

Keywords: Cultural economy, cultural heritage, travel cost method, museum demand

Resumo: Pelos efeitos de spillover que geram, os bens culturais são, cada vez mais, considerados nas políticas de desenvolvimento económico e social dos territórios. Todavia, como os bens culturais não são transaccionados no mercado, o seu valor de uso tem de ser calculado com recurso a métodos indirectos de avaliação ou de não mercado. Neste trabalho, opta-se pelo método do custo de viagem para se estimar a curva da procura do Museu de Lamego, que constitui um importante item cultural do Alto Douro Vinhateiro, classificado pela UNESCO, em 2001, como património da humanidade, paisagem cultural evolutiva viva. Os resultados da aplicação do modelo de Poisson confirmam o expectável, ou seja a probabilidade de visita ao Museu é influenciada positivamente pela escolaridade e pelo género feminino e negativamente pelo custo da viagem.

Palavras-chave: Economia da cultura, património cultural, método do custo de viagem, procura do museu.

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Introduction

The public and private view that culture is something which is only available to a narrow circle of specially educated people and with no economic importance is something from the past; nowadays it is considered to be a valuable resource for the development of specific geographical areas (European Commission, 2006).

Within the cultural assets, the traditional arts have special relevance (dancing, music, opera, and museums, among others), whose analysis was, in the past, confined to a non economic approach, consequence of the respective outputs being taken as “works of art” and not as “assets or cultural services” generators of economic value. However, since the 1990’s, attitudes have changed in relation to these cultural goods where they are now regarded as an endogenous resource and generators of spillover effects in the process of the development of territories (Bille and Schulze, 2008).

The heritage (material and non material) and the museums in particular have been earning a growing attention by economists, focusing on aspects such as economic impacts (Johnson and Thomas, 1992), the behaviour of museum management (Frey, 1994), the formulation of public policies (Peacock, 1994) and the origin of the financial resources of museums (Rodriguez and Blanco, 2006). Together with the economic analysis, museums have been publicly encouraged to turn to the markets, focusing on meeting the needs and attracting visitors. Interconnected with this approach, the public subsidies have been justified in terms of providing a public service which is evaluated by its users (Ashworth and Johnson, 1996) and whose opinion should be relevant to the strategy of public financing (Coelho and Santos, 2008).

Despite the advances of economic knowledge in different areas of intervention of museums, namely on the demand level (e.g. Sanz et al., 2003; Bedate et al., 2004), it is consensual that this is an unfinished study area, which should encourage research, for instance, on a micro economic level that brings into prominence the role of museums in the development of

specific territories, especially in attracting consumers. In order to do this, it is important to know the economic value that the current audience gives to the asset so as to establish coherent strategies with the habits and attitudes of the target public.

The aim of this paper is to determine the demand and value of a specific cultural asset (Museum of Lamego) set in the Alto Douro Vineyard (ADV), the oldest wine demarcated region in the world, which brings together a set of unique cultural, natural and landscape resources classified as a world heritage site by UNESCO in 2001 – a living and evolving cultural landscape.

To achieve this goal, the article is organised as follows: section 2 includes a literature review of the concept of culture and cultural heritage; section 3 includes a brief description of the museum in the context of the ADV; section 4 contains a description of the travel cost method; section 5 focuses on the model, data and results; finally section 6 concludes with a few final remarks.

Culture and cultural heritage: a literature review¹

The complexity and difficulty in economically appraising cultural items has its roots in the concepts of culture and cultural heritage. Culture is something fuzzy, hard to define and even more difficult to quantify (Papandrea, 1999).

Bearing the operational perspective in mind, Trimarchi (1994) notes the need to limit the set of goods and services using the concept of culture. Using the Throsby’s (1995) definition, culture can be seen, in a broadly approach, as the set of traditions, customs, practices and beliefs which characterize a group or society, or, in a narrower perspective, as the group of activities defined as art and produced by the cultural industries.

The definition of cultural goods and the notion of cultural heritage are also imprecise, turning the valuation of cultural items and goods into a complex task (Noonam, 2003), which complexity increases by the non-market nature of many cultural resources. McLoughlin et al. (2007) include cultural heritage in the definition of the

cultural sector, together with cultural industries, libraries and archives. Since its convention in 1972, UNESCO regards monuments, groups of buildings and places which are of interest and bear relevant civilization and cultural interest susceptible of being classified as cultural heritage. Klammer and Zuidhof (1998) classified cultural heritage as tangible and intangible (performing arts, languages, traditions, ...), including within the former the immovable heritage (monuments, historical centers, sites, cultural landscapes) and the movable heritage (paintings, sculptures, objects, collections, media ...). In the economic approach, the assumption that cultural heritage, (i.e., goods and cultural amenities) is a public good and generates spillover effects has been consensual among different authors (Frey, 2003). Therefore, its economic value is calculated using non-market techniques.

Among the tangible cultural heritage, museums have deserved special attention. They are often the extremely important attractions to a city, region or country, with high capability to attract cohorts of tourists (Frey, 1998), thus generating a multiplicity of spillover effects² over other economic activities specially connected with tourism, catering, local products, and so forth. For these reasons, museums are becoming increasingly important, with a large number of publications on the Economics of Museums (Frey and Meier, 2008), including the demand for museums, which is analyzed in this paper.

The museum in the context of the ADV

The ADV, which includes an area of 24.600 ha, is located in the north interior of Portugal along the Douro river and its tributaries (FRAH, 2000), included in 2001 on the list of world heritage sites, as a living and evolving cultural landscape, based on the following criteria (UNESCO, 2001): *The Alto Douro Region has been producing wine for nearly two thousand years and its landscape has been molded by human activities; The components of the Alto Douro landscape are representative of the full range of activities association with winemaking – terraces, quintas (wine-producing farm complexes), villages, chapels and roads; the cultural landscape of the Alto Douro is an*

outstanding example of a traditional European wine-producing region, reflecting the evolution of this human activity over time.

In economic terms, the ADV fits the designation of tangible heritage as a harmonious body which brings out as main elements: (a) its landscape and configuration and (b) other elements of the built heritage (farms and villages, religious elements and belvederes, settlements and monuments). As a whole, the ADV presents a huge complexity namely for (a) although coming from the past, it is still alive and “bursts into the present”; (b) it is a multiproduct, with the landscape configuration depending on the effort of many economic agents in the search for its economic and/or professional activity; (c) it has external constraints that force the maintenance of ancestral techniques and methodologies, together with pressures of an economic nature, low profitability of the sector, labour shortage and socio-economic characteristics of the population (FRAH, 2000; Lourenço, 2003); it is therefore necessary to have a process of dynamic preservation and economic development; (d) the protection process and valuation of the cultural heritage is more complex because it involves many stakeholders, from experts to owners/wine growers. Although in most cases it depends only on experts in the respective areas.

Out of the cultural items of the ADV, the urban agglomerate of Lamego, with its entire characteristic built heritage deserves special attention. The ML, included in this agglomerate, contains an important cultural and historic patrimony (furniture, tapestry, sculpture, painting, and sacred art) which is representative of the historical past and the ADV experiences, making it an important artistic reference in the regional, national and even international museum scenario.

Due to its characteristics, the ML has, simultaneously, historic, social and economic value for the region, clearly generating, spillover effects. It has historic value for it reflects the life conditions in the past, the works of art and other cultural objects. The social value is transmitted by its inheritance, contributing to the understanding of the nature of society in which we live by giving a sense of identity and place

where religion has a special meaning. In economic terms, a synthetic indicator of its relevance to the AVD is the observed audience, that is, the number of visitors. Effectively (figure 1) we verify that the number of visitors is close to the national average³, even though it is located in one of the underdeveloped Portuguese regions.

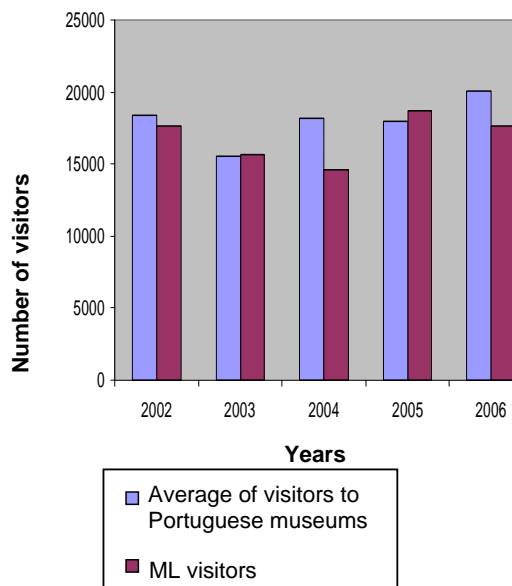


Figure 1 – Visitors to Portuguese museums and ML Source: Based on the data published by IPM – Instituto Português de Museus

The travel cost method

The restriction that made it difficult or even impossible to value public goods was overcome with the application in the last 40 years, of valuation techniques to non transactional or non-market goods, being worth mentioning, in an initial phase, the environmental goods. For cultural heritage, the studies are more recent. Throsby and Withers's work (1986) stands out in the application of techniques to performing arts and Navrud and Strand's (1991) in the application of contingent valuation to built heritage (Nidaros's Cathedral). A myriad of studies on cultural economics followed these publications which led to the publication of the Handbook of Cultural Economics (Towse, 2003) and the Handbook of the Economics of Art and Culture (Ginsburg and Throsby, 2008).

The valuation of cultural goods is difficult (Mason, 2000) due to: (a) the diversity of values (cultural, economic, political, and aesthetic, among others); (b) the fact that these values change over time and are strongly formed by environmental constraints (social forces, opportunity costs and cultural tendencies) and may come into conflict. In any case, the cultural goods present values of non use (option value, altruist value, existence value and bequest value) and of use. The latter can be calculated through techniques of revealed preferences (direct observation of consumer behaviour) or stated preferences (individual choice before scenarios). In empirical terms, the techniques of valuation of cultural heritage (use value), can be grouped in three⁴ broad categories: (a) Travel cost method (TCM), which uses the information on the visitor's expenses to the place of visit to derive its demand curve, using the trip cost as a price proxy. This technique is the most appropriate one to value already existing places and to estimate the demand in the absence of reference prices. (b) The hedonic prices method estimates the individual demand for cultural characteristics, using as comparison the price of the asset in issue with the price of other substitute goods. This method is appropriate to value investments in individual urban buildings where the improvements easily reflect on the market price, and when there are substitute goods. (c) Contingent valuation method which uses inquiry techniques to determine the availability to pay in order to have specific improvements in places of cultural heritage. This is a very flexible technique, once it can be used to analyse any benefit provided by the site, as well as the value of existence.

Through the TCM (Haab and McConnell, 2002) it is possible to elaborate a demand model derived from a person's time and income allocation for goods not traded in the market, as is the case of heritage ones. This model of revealed preference provides a generic demand function for a single place. Suppose an individual i chooses x_{ij} , visits to the site j , for $j = 1, \dots, n$ where n is the number of visits. The travel cost for each visit is c_{ij} . The individual also buys a bundle of goods, z_i , at a standard price of 1, and he can't spend more than his

income, y_i . The consequent budgetary restriction of this consumer is expressed by:

$$\sum_{j=1}^n x_{ij} c_{ij} + z_i \leq y_i$$

Each trip takes t_{ij} time units, where these must be consistently measured with the rest of the time restriction. Even though the individual has an additional fixed income, this comes mostly from the one earned at his job. When the individual works h hours per time period, the time restriction is given by:

$$\sum_{j=1}^n x_{ij} t_{ij} + h_i = T_i$$

where T is the total available time. By assuming that the amount of time spent is the same for all individuals in leisure time, regardless if t_{ij} measures the total time per trip or the time spent at the place, because the difference will be the time spent with the trip.

The time restriction is the starting point for the generic consumer model of Becker of the time allocation, in which the total that one can spend of income is given by $y_i = y_i^0 + w_i h_i$ where w is the wage rate after taxes are deducted and y^0 is the fixed (non labour) income. When the restricted time is expressed in working hours (h) and it is replaced in the restrict income, then the budgetary restriction is thus expressed by:

$$\sum_{j=1}^n x_{ij} (c_{ij} + w_i t_{ij}) + z_i \leq y_i$$

The preference function or utility for the individual i is given by $u(x_{i1}, \dots, x_{in}, q_1, \dots, q_n, z_i)$. Each q_j is the quality of place to visit and z_i the travel cost, as well as the variables of the consumer's behaviour. The quantity and quality of the trips for the various recreational spots provides utility, but other aspects of the trip, like the time travelled or the used inputs for the travel production function do not provide utility.

Inherent to the previous model is the assumption for the basic model to be built based on standardised prices parameters. In addition, in order to have trust over the welfare measure, deducted from the demand function which the explanatory variable is the travel cost (Haab and McConnell, 2002), it is necessary to assume that: (a) The travel cost and time spent is a sub-

stitute of the price of the recreational trip. This assumption is violated if any item of the travel cost provides utility on its own, as, for instance, the transportation cost of a boat trip which is part of the trip. (b) The time cost is neutral, that is, it provides neither utility, nor disutility. This assumption is violated when a place is chosen as opposed to others because travelling to that place provides utility. (c) The decision component is to travel through the same route by all consumers. (d) The trip is of one single purpose, taken to the place with the purpose of leisure time. Trips with multiple motives are hard to manage, especially when they occur during a certain period of time. However, when a consumer takes a week off and goes to a certain place, only the travel cost to the place is considered, that is, from the vacation place to the place being studied. (e) The quantity consumed in the basic equation – that is, the x_{ij} – represents the visits to the same place, for the different consumers.

When applied to a single site, the TCM has been fundamentally developed by following two guiding lines: zonal TCM and the individual TCM (Bedate et al, 2004), whose main difference is in the fact that the first method, instead of using individual data, resorts to joined data from all visitors, by residence places. In the case included in this paper, the structure of the collected data (see the following section) suggests applying the individual TCM.

Model, data and results

Model

The estimation of the econometric model inherent to the individual TCM applied to a single site starts with the definition of the dependent variable, which must express the demanded quantity of the cultural asset, and is usually expressed by the number of times the consumer has visited the cultural item. In this scenario, the discrete choice model that, typically, must be applied is the count data, being the regression model of Poisson (Greene, 2003) the one that has been used the most for this type of data.

In the Poisson model,

$$\Pr(x_i = n) = f(z_i \beta), \text{ e } n = 0, 1, 2, \dots$$

in which: x_i is the number of visits to the

site in study, assuming values higher than zero; z_i expresses the travel cost and other exogenous or control variables that represent the behaviour of the consumer.

The Poisson probabilistic density function is given by:

$$\Pr(x_i = n) = \frac{e^{-\lambda_i} \lambda_i^n}{n!}, n = 0, 1, 2, \dots$$

Having the λ_i parameter representing the average and the variance of the distribution. Since it is necessary that $\lambda_i > 0$, it is common to specify it as an exponential function:

$$\lambda_i = \exp(z_i \beta)$$

From this specification, it is possible to obtain the probability function in terms of β parameters, with $\ln \lambda_i = f(z_i, \beta)$ expressing this expression the log linear model, with the probability function given by:

$$L(\beta | z, x) = \prod_{i=1}^T \frac{\exp(-\exp(z_i \beta)) \exp((z_i \beta) x_i)}{x_i!}$$

Logarithmizing this function:

$$\ln(L(\beta | z, x)) = \sum \left[-e^{z_i \beta} + z_i \beta x_i - \ln(x_i!) \right]$$

The last function is globally concave in the parameters, with the log-likelihood function rapidly converging, with the estimate of the parameters, unless there is great collinearity among the explanatory variables.

Once estimated the regression model parameters, the marginal effect of each quantitative⁵ explanatory variable is given by:

$$\frac{\partial E(x_i | z_i \beta)}{\partial z_j} = \beta_j \exp(z_i \beta)$$

However, since the validity of the results of the Poisson model depends on the verification of the basic hypothesis, the equality between average and variance, once estimated the model, the first step to take is to verify whether this hypothesis is verified, that is,

$$E(x_i | z_i \beta) = V(x_i | z_i \beta) = \lambda_i \quad \text{Greene}$$

(2003) suggests a procedure based on a simple regression to test the null hypothesis (H0): $Var[y_i] = E[y_i]$ against the alternative hypothesis (H1): $Var[y_i] = E[y_i] + \alpha g(E[y_i])$, whose validation is tested by applying the t Student statistic.

Data

The data was collected from November 2005 until September 2006, with 403 questionnaires, of which 373 were validated. Most of the questionnaires were carried out in the period of greater tourist affluence (July and August 2006) during the other months the sample was significantly smaller.

The questionnaire (see annex) surveys were distributed at the Museum Lamego and was organised in order to explain the number of visits to the ML (x_i), in relation to: (a) a set of socioeconomic variables, like visits to other museums, the satisfaction obtained from the visit, gender, age, educational level and income; (b) and the travel cost.

For the calculus of the travel cost along with considering the journey from the place of the inquired person's usual residence to the museum and return, the duration (number of days of the journey), was also considered, if it was done in a private vehicle⁶ or not and also the number of occupants of the vehicle (Bedate et al., 2004),

$$\frac{(\text{Kilometers} \times 2 \times 0.38 \text{ euros}) + (59.73 \text{ euros} \times \text{NrDays})}{\text{Nrpassenger} \times \text{NrDays}}$$

having as a result the following expression:

Table 1 includes some statistical information about the collected data. Most visitors travelled with someone, left their residence in an organised trip and the car was the predominant means of transport. There were slightly more respondents of the female gender, on average visitors from other museums, who considered the visit very satisfactory, with medium or higher education and a monthly income capita above 750 euros. The average travel cost inherent to the visit to the ML is of 36.4 euros, with an average of 1.98 visits.

Variable	Sample Percentage	Average	Standard deviation	Minimum	Maximum
Travel with someone – No	5.90				
Left place of residence – No	30.56				
Organised trip – No	19.30				
Means of transport – Car	66.22				
Satisfaction					
Very satisfactory	58.18				
Satisfactory	41.29				
Little satisfactory	0.54				
Not satisfactory	0				
Gender(Man=0; Woman=1)	51.74				
Educational level					
Compulsory	21.72				
Medium	31.37				
Higher	46.92				
Monthly income					
Less than €750	22.79				
Between €750 and €1.500	38.34				
Between €1.501 and €2.500	23.32				
More than €2.501	15.55				
Days out		4.25	5.01	1	60
Number of visits to the ML		1.89	1.98	1	20
Visits per year to other museums		4.37	5.55	0	40
Age		45.97	17.19	12	90
Travel cost (in euros)		36.40	24.07	4.98	166.29

Table 1 – Data variable statistics

Results

Table 2 contains the results of the Poisson model estimation, including the over-dispersion indicators. The values of the t Student statistic applied to the analysis on the over-dispersion allow us to conclude about the rejection of its own existence, thus taking as statistically valid⁷ the results of the Poisson model.

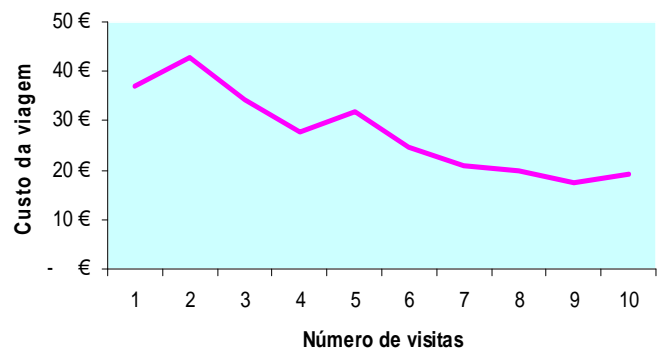


Figure 2 – ML demand curve

<i>Variable</i>	<i>Coefficient</i>	<i>Marginal Effect</i>
Constant	0.6216876 7*	1.1767 0642**
Visits to other museums	0.0122508 9	0.0231 8801
Satisfaction	0.0254491 2	0.0481 6911
Gender	0.4554453 2*	0.8620 4932*
Age	- 0.00315721	- 0.005975 84
Level of education	0.1296808 4**	0.2454 5488**
Income	- 0.06019399	- 0.113932 86
Travel cost	- 0.00743499*	- 0.014072 66*

Log likelihood function = -637.9138

Restricted log likelihood function = -669.0964

Chi-square = 62.36509 (significance level= 0,0000)

Over-dispersion test: $g = \mu(i)$: 1.284 (statistic $\hat{\theta}$)

Over-dispersion test: $g = \mu(i)^2$: 1.575 (statistic $\hat{\theta}$)

* Individually significant at 1%; ** individually significant at 5%

Table 2 – Results of the *Poisson* model

The value of the Chi-square statistic indicates that the regression is globally significant at 1% of significance level. Individually, only the variables associated with gender, educational level and travel cost are statistically significant, the first and the third to 1% and the second to 5% level of significance.

The sign and significance of the marginal effects, on the average of the variables, goes in the same direction as the individual regression coefficients, indicating the probability of change in the visit, compared with a variation of the explanatory variable unit or, if this is binary, the difference in probability due to the presence or absence of the attribute. The remaining variables (visits to other museums, satisfaction, income and age), since they are statistically non-significant, do not influence the visit probability to the ML.

Overall, we can state that, economically, the results are according the expected, that is, the travel cost negatively affects the number of visits. These increase along with the education level and women tend to visit the museum more.

As for the remaining variables, though considering their statistic non-significance, the results indicate the existence of some fidelity of the consumers of the museums (expressed by the “visits to other museums”) and that people with a higher income are those who visit the museum the most.

The demand curve that can be deduced from the results of the TCM (table 2) is

presented in figure 2. We verify that it is a typical curve of this kind of assets, tending to increase as a decrease of the travel cost occurs, although this effect tends to disappear as the consumption increases, entering a satiety phase.

Final remarks

In an increasing globalised world, the economy and culture can be seen as the two most powerful forces for human behaviour, with great influence in the social and economical development of territories due to spillover effects.

Most of the cultural assets are labelled as public goods, that is, they have non-rivalry and non-exclusion characteristics, and there are no markets able to express their value in terms of real prices. Hence there is the need for indirect methods of expression of the preferences of consumers and consequent measures of valuation. Among these methods is the travel cost, which is directly related to the calculus of availability to pay for the use of cultural heritage through the economic effort associated with the trip to the site to visit.

From the demand curve estimated (relationship between number of visits and unitary travel cost) for the cultural item it is possible: (a) to determine the consumer's surplus, that is, the maximum he is willing to pay for the good; (b) predict the effects of public policies, as fixation of taxes, subsidies, entrance fees or, simply, decisions about the preservation or deterioration of the asset in regard.

In this context the TCM was applied to value a cultural item (Museum of Lamego) relevant for the demand of the ADV, classified as a world heritage site (a living and evolving cultural landscape), by UNESCO in 2001. The results obtained allow us to conclude that an increase of the probability visits to the ML has underlying: (a) a decrease of the travel cost, for instance by offering better means of transport; (b) strategies towards visitors of higher schooling and of the female gender. Variables such as income and the number of visits to other museums do not influence the demand probability.

Obviously the obtained results have to be analysed and put into perspective con-

sidering the method and the data used, in the future being able to and having to reinforce the analysis of the robustness of the results, for instance, by: (a) expanding the sample; (b) using the same method and comparing the results to other similar cultural items; (c) comparing with results obtained from other indirect valuation methods (e.g., zonal travel cost; discrete choice experiment and referendum).

On the other hand, the implementation of strategies to increase the number of visitors must go beyond the quantitative and economic aspects considered in this paper, assuming that in people's decision process, beyond the availability to pay, there are also artistic, historic, social and even political values that are hardly quantifiable. In summary, we must be aware that the indirect calculation methods of the value of the use of the cultural heritage provide an individual and social rate of order of the preferences, according to the cultural item in analysis.

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Annex: Questionnaire

The aim of this questionnaire is to ensure a more complete understanding of the visitors of the Museum of Lamego. The questionnaire is anonymous and untraceable.

1. Do you travel alone? Yes ☐
 No ☐
 If your answer was No how many people do you travel with?

2. Did you leave your hometown to travel today? ☐es
 No ☐
 If No, where did you sleep? (town)

3. How many nights will you be spending away from home on this trip?

4. Was your trip organized by a travel agency (package tour)?
 Yes ☐ Which agency organized it? _____
 No ☐
5. How did you get to Museum of Lamego?
 Car ☐ Bus ☐ Other ☐
 Which? _____
6. Is this your first visit to the Museum of Lamego?
 Yes ☐ No ☐
 How often did you visit it? _____
7. Do you usually visit museums?
 Yes ☐ How often do you visit them?

No ☐

8. Your visit was:
 Excellent ☐ Good ☐ Fair ☐ Poor ☐

About you:

9. Gender: Male ☐ Female ☐

10. Age: _____

11. Where do you live? (country)

12. Education:

- Primary School ☐
 Secondary School ☐
 Higher education ☐

13. How much do you earn per month (after deduction)? _____ €

- Less than €750 ☐
 €750 to €1500 ☐
 €1501 to €2500 ☐
 More than €2501 ☐

14. What is your job?

Comments / Suggestions / Critics

Thank you for taking the time to complete this questionnaire

Notes

1 Cultural economics is a relatively recent area of research, deserving special attention only since the 1980s. However, over the last 30 or 40 years a substantial literature has grown in which the tools of economic theory and analysis have been applied to problems in the arts and culture (Throsby, 2008: 4). In this scenario, the scope of

this section is essentially to delimit the concept of culture and cultural heritage.

2 Wine regions, most of them located in economically depressed rural areas, are a paradigm of this situation. The majority of wine regions, even in the New World Wine-Producing countries (e.g. Australia, New Zealand, USA, Chile, ...), have museums devoted to vineyards and wine, with the simultaneous objective of preserving the collective memory inherent to the wine activity and to attract visitors, thereby promoting products and the region. Even though these are thematic museums, their economic valuation is calculated using techniques similar like the ones used for other cultural heritage.

3 The average excludes the museums located in Lisbon and Conimbriga that have a larger number of visitors.

4 The first two fit in the category of revealed preferences and the third in stated preferences.

5 For dummy variables the marginal effect is given by:

$$\text{Prob}(x_i | z_i = 1) - \text{Prob}(x_i | z_i = 0)$$

6 Since in the inquiry phase it was not possible to collect reliable sources about costs inherent to the journey, as reference, the numbers paid by the State to its employees were used: 0.38 euros/km, when the journey is done in a private vehicle; 59.73 euros of daily benefit for other assignments. On the other hand, it was assumed that the visitors take a day to visit the museum

7 In case that didn't happen, the negative binomial model would have to be chosen.

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