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## Optimising Use of Cultural Heritage

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# Optimising the Use of Cultural Heritage

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## 1. Introduction

“Optimising the Use of Cultural Heritage” is a title that may provoke misunderstandings. It is therefore worthwhile to start by indicating what will not be addressed in the paper. This paper will not give an in-depth analysis of the costs and benefits that arise from inherited works of art and architecture, from the preservation of knowledge about a society and its history for future generations, or from a set of shared norms and ideals that are essential for the working of a community. Neither will it tackle the problem of how these costs and benefits can be measured<sup>1</sup>, nor how strategic incentives to misrepresent individual valuation can be overcome.<sup>2</sup>

Rather it will try to analyse how the institutional arrangements under which specific parts of the cultural heritage are made available to potential users affect the welfare created by the use of these items. The analysis presented below will, therefore, take as

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<sup>1</sup>See, for example, Bille Hansen (1995) or the paper presented at this conference by Frey (1995).

<sup>2</sup>For the importance of these strategic incentives to misrepresent individual valuations for public goods see, for example, Throsby and Withers (1986).

given the notion of specific costs and benefits that result from the use of the cultural heritage and will try to assess which form of use will maximise the difference between benefits and costs.

In order to achieve this goal, we will first attempt to give a working definition of “cultural heritage” for the purpose of the subsequent analysis (section 2.1). Furthermore, a brief discussion of the potential benefits and costs is necessary (section 2.2). The main part of this paper, however, will focus on a simple model in order to show how the welfare that can be derived from the use of things belonging to the cultural heritage depends on the institutional arrangements that govern this use (section 3). This analysis allows us to draw some implications for the optimal use of cultural heritage (section 4).

Of course, the focus chosen in this paper does not imply that the problems analysed are the most important ones which need to be solved for optimising the use of cultural heritage. It may even seem that the treatment of the subject is likely to deprive cultural heritage of all its distinctive features. One should keep in mind, however, that a thorough understanding of the basic determinants of aggregate welfare can be regarded as a useful if not necessary contribution to any sensible policy recommendation. The way in which different forms of provision affect aggregate welfare can serve as a guideline for (empirical) research into the specific costs and benefits associated with specific forms of cultural heritage. Decisions about the preservation of cultural heritage ultimately have to be made on the basis of information about value that can and will be drawn from the preserved objects. In order to avoid decisions that are likely to decrease welfare, it is crucial to recognise the way in which the specific institutional arrangements chosen affect the value that will be realised. In this sense, the simple analysis presented in this paper will hopefully complement the work that has been done and has to be done in this field.

## **2. An Economic View of Cultural Heritage**

### **2.1 Cultural Heritage: A Working Definition**

Unfortunately, a clear cut definition of cultural heritage that could be used for economic analysis does not exist. The review of “Cost Benefit Analysis for the Cultural Built Heritage” (ICOMOS, 1993) starts from the assertion that “each generation finds itself with a huge amount of capital resources, to which each individual has access simply through being born into the human race. The capital is broadly made up of three kinds:

- a) natural resources (God or Nature given)
- b) man-made resources ... comprising broadly the immoveables (the built environment) and moveables (the furnitures, cars etc) ...
- c) human resources, being the people inhabiting and multiplying on the planet,”

where the cultural built heritage can be defined as the “part of the built environment which the contemporary generation resolves has ‘cultural values’, and accordingly merits special protection.”<sup>3</sup> Vaughan (1984, p. 1) starts his analysis of income and employment effects of cultural heritage by stating that “[t]he cultural heritage of a nation consists of three parts: the artistic, the natural and the historical. ... [O]ver recent years ... an increasingly important part of the debate has focused attention of the economic impact of the heritage.”

If in most cases we can talk about “cultural heritage” without ever giving a clear definition of the term, this may exactly be due to the fact that we share the same cultural heritage. But even if this common understanding allows us to use terms without giving them an exact definition, the term “cultural heritage” can be used in such a broad sense that any attempt to derive a set of conditions for “optimal use” of everything that might be included under this term must seem ridiculous. We have to look for a working definition of cultural heritage for the purpose of this paper, i.e. for a definition suitable to address the question of optimal use.

Let us start with a broad definition of cultural heritage. It comprises things like works of art and architecture, cultural achievements as well as ideas, norms and a common understanding of the environment that have been passed on from earlier generations. A common characteristic of all objects that fall under this definition is that they need not to be produced by the current generation, but are inherited from previous generations.

These items can roughly be divided between tangible assets (such as works of art and architecture) and intangible assets (such as a common identity, social and moral norms that are rooted in a shared culture, and so on). This latter part, important as it may be

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<sup>3</sup>At least with regard to the man-made resources (and also with regard to some natural resources), the “access through simply being born into the human race”, of course, seems to be an instance of wishful thinking, as anyone can prove who has ever tried to enter, for example, the *Colosseo* or the *Palazzo Pitti* only by virtue of being a member of the human race.

for the functioning of any ordered society, shall not be part of our subsequent analysis.<sup>4</sup> Rather, we will concentrate on the tangible assets that are passed on from previous generations, such as works of art, architecture, man-made modifications of the natural environment, and so on. These tangible assets are capital resources in the sense of the ICOMOS definition. The stock of resources inherited from past generations creates a flow of benefits (a rate of return), and will depreciate if not maintained.

To differentiate *cultural* heritage from the broader class of inherited objects, another criterion must be met: the tangible objects under consideration must be valued not only with regard to the potential use for which they were originally produced, but for their connection to the cultural development of a society. These objects are valued for their status as the manifestation of the cultural development of the past.<sup>5</sup>

This effect is reflected in the valuation of cultural heritage. It is not only due to its aesthetic qualities or its usefulness for the purposes of daily life (e.g. the value of a renaissance *palazzo* as a dwelling for contemporary tenants) that the legacy of past generations is of interest to contemporaries, but it also results from its role as the visible and tangible part of the ideas and norms that formed the evolution of our society.

To summarise: we will use the term “cultural heritage” in the subsequent analysis for a collection of tangible objects related to the cultural development of a society that are inherited from past generations and are valued by contemporaries not only for their aesthetic values or for their usefulness, but also as an expression of the cultural development of a society.

This stock of tangible assets can be used in two principal ways.<sup>6</sup> On the one hand, the use can focus on the immediate functional aspects of the objects. This is to say that, for example, a renaissance *palazzo* can be used as a dwelling (or, more probably, as an

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<sup>4</sup>Of course, this does not imply that the analysis of norms and rules as well as their cultural origin are not amenable to economic analysis. On the contrary, the importance of those norms and values and their effects on the co-operation and co-ordination within a society have been a central part of much of the recent development in the ‘New Institutional Economics’. Among many others see, for example, the works of Douglass North (notably his “Institutions, Institutional Change and Economic Performance”, (North, 1990) or Robert Sugden (e.g. Sugden (1986).

<sup>5</sup>In this respect, the tangible part of the cultural heritage is closely connected to the intangible part (i.e. ideas, norms and, more generally, the intellectual development of a society), because its production has been affected by these ideas and, therefore, it can be regarded as an expression or representation of the cultural identity of a society in a particular period. For example, renaissance architecture is strongly connected to the ideals of humanism and to European society’s reminiscence of its ancient origins (see, for example, the excellent study by Wittkower [1983]).

<sup>6</sup>Notwithstanding this principal distinction, both forms of use may not be easily distinguishable and can overlap.

office building or a conference centre). On the other hand, the objects can be used in a way that builds upon their special characteristics as part of the cultural heritage. In this case, the *palazzo* would have to be made available to the general public in the form of, for example, a museum.

To distinguish cultural heritage from other inherited objects, we will assume that for elements of cultural heritage the value that is attributed to the second form of use exceeds the value that is attributed to the first form of use.

## **2.2 The Benefits and Costs from the Use of Cultural Heritage**

### **2.2.1 Direct and External Benefits**

The most obvious benefit from the use of cultural heritage is determined by the value that “consumers” of cultural heritage put onto the “product” (or, more exactly, the stream of services that flow from the use of this stock of cultural heritage). In this sense, the benefits from use are expressed in the individual users’ willingness to pay for these goods or services.<sup>7</sup>

As for works of art more generally, one might argue that there exist external benefits from the use of cultural heritage that are not fully reflected in the individual users’ valuation. In looking for these benefits, a promising place to start is the collection of arguments brought forward to justify public support for the arts. These arguments may point to possible benefits from the existence and use of cultural heritage that go beyond the immediate value put onto the stock of cultural heritage by its “users” in the proper sense.<sup>8</sup>

Following Duffy (1992), who examines these arguments with regard to public funding of national museums, there are several strands along which one can try to argue for additional benefits from the existence or use of works of art. Let us briefly consider them in turn:

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<sup>7</sup>For the sake of simplicity, the analysis in this paper will be conducted in terms of discounted streams of returns and (re-)investments. Of course, this present value approach ignores the timing of investment decisions and the effects from discounting, but allows for a clearer exposition of the basic problems.

<sup>8</sup> Any consideration of these arguments, however, has to take into account that they are used in many (if not most cases) to justify public funding and are, thus, more often than not an instance of rent-seeking behaviour (see, for example Peacock (1992), or Lingle (1992)).

### **a) Option Demand and Existence Value**

By option demand, it is meant that individuals benefit from the availability of (preserved and accessible) cultural heritage, even though they do not actually use these facilities. As Duffy (1992, p. 38) observes, the “existence of option demand is a possible area of market failure since under the market system those who do not consume goods or services are not, in general, in a position to express their preferences through payment”. Of course, this is a fairly general situation that can be found in all markets where the amount exchanged at a given price is below market satiation. All people who are not willing to buy widgets at their current price may nevertheless put a value onto widgets. The only signal that is transmitted in the marketplace is that their valuation of widgets is less than the price.<sup>9</sup>

Therefore, option demand may more properly be defined as the feature that individuals like being able to satisfy their demand in case they will possibly demand these goods or services in the future. This is to say, that individuals put a value onto the availability of specific goods or services even at present they would not consume these goods and services at the given price.<sup>10</sup>

### **b) Merit Goods/Information Deficiency:**

The merit good argument essentially states that works of art, or a stock of cultural heritage for that matter, are intrinsically valuable. The merit value of a good or a service, thus, is by definition independent from the valuation by actual as well as possible users.<sup>11</sup> The basic problem with this merit good argument is that it is incompatible with the methodological framework of economics. Neither the principle of methodological individualism nor the commonly accepted principle of subjectivism will allow for such thing as a merit good or a merit want.<sup>12</sup> Economists usually tend to take as given individual preferences, even if they are not stable but subject to endogeneous changes. These preferences are not to be evaluated from the position of an outside observer. By

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<sup>9</sup>In the same way, people who buy widgets do not express their valuation, but only signal that this valuation widgets is above the market price.

<sup>10</sup>Thus, option demand can be seen as a kind of insurance demand, which is a problem only in cases where a free rider problem exists. If individuals know that a specific supply will be maintained only if they contribute to the current cost of providing the good or service, then the problem vanishes. Furthermore, option demand is expressed in a willingness to pay - basically not for the product or the service, but for the option to buy the product or service in the future (for a more detailed description of option demand or option value see e.g. Nijkamp (1991, p. 8 f).

<sup>11</sup>See Musgrave (1959) or Priddat (1992).

<sup>12</sup>See e.g. Culyer (1971, 1973) or, for a discussion of the methodological problems, Erlei (1992) and Koboldt (1995, p. 151 ff.)

methodological individualism, all value judgments must be grounded on the individual preferences - there is no interest of a society or a collective that is independent or underivable from the interests of the individual members. Consumers may or may not be ignorant and uncertain about their own welfare. But the ultimate test of this assertion remains in the realm of the impossible, and all arguments that are not based on individual valuations must be rejected.<sup>13</sup>

**c) Production Externalities - Tourism/Employment/Regional Development:**

Positive externalities and spillovers from the availability of cultural experiences are often maintained as reasons that justify public support. Thus, one has to examine the extent to which benefits from the use of cultural heritage arise from such positive spillovers. With regard to tourism and employment, of course, only the *incremental* effect that results from the use of cultural heritage must be taken into account. This is to say that the positive effects of the availability of a historic site on tourism, for example, must be assessed on the comparison with a situation that is identical but for the availability of this historic site. Basically, it is only the additional income (as compared to income from other uses of the resources devoted to tourism) due to the additional inflow of tourists resulting from the potential visit to a historic site that can truly be regarded as a positive effect of the use of this specific form of cultural heritage. Apparently, the positive effects of cultural heritage are easily overestimated.

**d) Consumption Externalities - National Identity/Education/Research/Future Generations:**

Allegedly, the arts in general, show consumption externalities such as the development of a national identity, benefits from education and research, or the preservation of knowledge about a society for future generations.

With regard to these externalities, one has to distinguish very carefully between effects that depend on the use or the pure existence of cultural heritage. Consider, for example, the development of national identity. If national identity - which is without any further discussion assumed to be valuable - flows from the pure existence of artistic production or the preservation of the cultural heritage, then the benefits from cultural heritage are

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<sup>13</sup>Of course, common sense may tell us that in many cases individuals are very likely to be uncertain or even ignorant about their own welfare. A parsimonious statement and, more so, a policy prescription require stronger foundations than the simple impression that other people who are usually regarded as autonomous individuals who are responsible for themselves (i.e. grown ups who can care for their own) do not know what is really good for them. This is particularly true if this judgment is based on the fact that people do not want to pay for a good or service which the (potential) suppliers think they should buy.



realised even if no individual would ever “use” this heritage in the sense of deriving direct benefits. If, on the other hand, the formation of national identity depends on the experience of actually using the stock of cultural heritage, then the intensity of use becomes important.

Furthermore, some of these externalities may not be unique to cultural heritage, and could be used to argue for universal interventionism, so that one has to be very careful about where to draw the line. For example, positive externalities from education are more general and not confined to the field of culture or art.<sup>14</sup> Moreover, it is not only education that may improve the quality of citizenship. The argument could easily be extended. If well educated people tend to be better citizens, so do people who are well fed and well clothed. The argument basically supports a minimum standard of living that must be provided if society does not want to fall back into anarchy.

Finally, in many cases the future-generation argument considers only a positive value that future generations are expected to put onto the inherited objects from the past, and often neglects the possibility that future generations may see the legacy as a burden. In any case, the future-generation argument has to be supported by a careful analysis of the extent to which future generations benefit from having a wider range of choices resulting from the bequest of cultural heritage. Clearly, there is a difference between assets that would be lost forever without efforts to preserve them for future generations, assets that would be preserved even without conscious efforts to preservation, and assets that can be recreated by future generations if they so wish (see Peacock (1992, p. 12)).<sup>15</sup>

### **2.2.2 Benefits and Use**

Looking at all the arguments that try to identify the benefits that can be derived from cultural heritage, it seems to be the case that

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<sup>14</sup>For example, Clawson and Knetsch (1966, p. 267) attribute this effect also to outdoor recreation: “It is widely argued ... that outdoor recreation is essential to a full and well-balanced personal life; that those who participate in outdoor recreation tend to become better adjusted socially and better and more productive citizens; and thus the welfare of the whole nation is enhanced. According to this argument, everyone benefits in some way, and even those who do not partake of outdoor recreation have an interest in its ready availability, and should be willing to pay for it.”

<sup>15</sup>The tradition of Shakesperean plays performed in the settings of an Elizabethan stage seems to be one example in case. The reconstruction of the soon to be opened Globe theatre in Southwark, the original theatre having been destroyed in the 17th century, is an attempt to bring back to live also the original theatrical experience.

- many if not most of the benefits are realised only in the course of actual use. Therefore, the number of people who can and do use the cultural heritage is of paramount importance. Even if some external benefits accrue to persons who will not use the cultural heritage themselves, they may not be independent from the level of use. For example, the educational effects of cultural heritage may not be realised simply by cultural heritage being around, but may require those who are to be educated to actually use this stock of heritage, although others benefit from this use;
- There may be a second category of external effects resulting from the *existence* of cultural heritage. These benefits are “public” in the sense that they can be realised in a nonrivalrous way, i.e. the benefits experienced by one individual do not diminish the benefits that can be experienced by other individuals. Additionally, there may be nonexcludability, leading to free riding, as in the case of the development of national identity and prestige. These benefits arise mainly from the fact that tangible objects of the cultural heritage are a necessary precondition for the existence of the intangible part of the cultural heritage. In a sense, they may be regarded as the crystallisation point for norms and ideas that are rooted in a common cultural tradition.<sup>16</sup>

In any case, the external benefits commonly alleged to the existence and use of cultural heritage have to be analysed very carefully and suspiciously, as the arguments more often than not are intended to justify public funding and are, therefore, results of rent-seeking behaviour rather than of serious analysis.<sup>17</sup>

### **2.2.3 The costs of using cultural heritage**

In contrast to the possible benefits from using the cultural heritage, the costs can be defined more easily: in economic terms, it is the opportunity cost that must be attributed to the preservation and the use of those objects that are conceived of as the cultural heritage. This opportunity cost clearly does not comprise only outlays (eg for the preservation of an historic site). When determining opportunity cost, one has also

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<sup>16</sup>Thus, cultural heritage may show characteristic features similar to the output of the performing arts which “can be characterized as a mixed good with joint production of a private component enjoyed by the individual attendees and a public-good component deriving from the value of the arts and culture to society at a large.” (Throsby, 1994, p. 9)

<sup>17</sup>For example, Globerman (1989, p. 17) explicitly states that “[e]conomic models of rent-seeking behaviour ... suggest that we should adopt a much more cautious attitude towards invocations of the externalities argument.” See also footnote 8.

to take into account benefits foregone from alternative uses of the territory covered by the historic site (cf. Tiepelmann (1992, p. 266 ff)). The opportunity cost of preserving *Ercolaneio* must comprise the price or the rent for the area if it had to be bought or rented from somebody whose next best alternative would be to build a large supermarket or tennis courts. The benefits from alternative uses foregone must be incorporated in the opportunity cost of using the site in the way it is used.

Of course, it may be extremely difficult to measure the costs associated with the preservation (or existence) and use of cultural heritage. With regard to the planning of conservation projects, for example, Nijkamp (1991, p. 18) states: “An inherent problem in the measurement of costs is whether they can be separated from other costs and hence can be unambiguously attributed to the project. Infrastructure investments necessary for a new project or plan generate costs which cannot exclusively be attributed to a single use, as they have normally a multi-purpose character”.

Nevertheless, “the powerful and simple concept of opportunity cost is the economists’ greatest gift to policy analysis. If we cannot precisely measure the opportunity costs of different policies, the concept is no less relevant” (Globerman, 1989, p. 17).

### **3. Using Cultural Heritage: A Simple Model**

In this section, we will consider the “optimal use” of cultural heritage under different scenarios within the framework of a simple model. We will take as given the existence of preferences for the use of cultural heritage, and costs of this use. For the sake of simplicity, we will abstract from external benefits, assuming that most (if not all) of the benefits are realised by the users.<sup>18</sup>

Let us consider a specific form of cultural heritage, say a historic site, that can be made available to visitors. Let us assume that there are  $n$  potential visitors to the site. For the sake of simplicity, we will assume homogeneous individuals with identical tastes.

#### **3.1 The basic model: maximising welfare**

As a reference for the analysis of different scenarios, we will first define the welfare-maximising use of cultural heritage. This is to say that we look at a situation where the sum of consumer and “producer” surplus is maximised without any reference to the allocation mechanism that could bring about this situation.

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<sup>18</sup>We will, however, consider external benefits in the implications drawn in the concluding section.

First, we have to model the benefits and costs that result from the use of the historic site. For the sake of simplicity, we will assume that the number of visits and the quality of the site will remain constant over time, so that we can avoid looking at the temporal dimension by explicitly examining the discounted streams of costs and benefits that arise over the “lifespan” of the site (which may, of course, be infinite).

The average valuation<sup>19</sup> put onto one visit to the site by any individual visitor will be denoted by  $v(q, x)$ , where  $q$  stands for the “quality” of the site, e.g. the way it is presented to the visitor, the effort made by the providers to guide visitors through the site, etc, and where  $x$  denotes the number of visits made by this individual visitor. The average valuation per visit is assumed to increase with the quality of the site ( $v_q > 0$ ), and to decrease with the number of visits ( $v_x < 0$ ). Additionally, we will assume that the decrease in the average value per visit is stronger with an increase in the number of visits  $x$ , i.e.  $v_{xx} < 0$ .<sup>20</sup>

Let us assume that making the site available to visitors and maintaining a specific level of quality costs  $m(q)$  with  $m_q > 0$  and  $m_{qq} \geq 0$ . We assume that this cost is independent of the number of visitors. Of course, the cost for cleaning up the site or the (expected) cost of replacing broken items may increase with the number of visitors. But at least within a certain range, an additional visitor can “consume” the quality of the site without

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<sup>19</sup>We will cast the analysis in terms of average valuation and average costs rather than total value and total costs for the sake of expositional convenience.

<sup>20</sup>This assumption is consistent with the usual assumption of diminishing marginal utility, given stable preferences. Of course, one might argue that the “consumption” of cultural heritage has an educational effect, and thus, preferences may change with the number of visits to a historic site. Thus, consuming cultural heritage may give rise to endogenous changes of taste. For the purpose of this paper we will abstract from this possibility, noting that the same *effects* that can result from endogenous changes of taste can be modelled as changes in the “consumption” technology, i.e. as changes in the relative prices of different commodities. For this approach see Stigler and Becker (1977) or Becker and Murphy (1988). Even if this approach may entail the same problems as an approach that allows for changes in the preferences of individuals (cf. Yaari (1977)), it does avoid the difficulties with assessing alternative allocations with reference to the individuals’ preferences (for a discussion see Koboldt (1995, p. 47 ff)).

As Throsby (1994, p. 3) notes, “[r]egardless of the theoretical underpinning, ... the endogenization of tastes is likely to be essential if any progress is to be made in *explaining* demand for the arts.” (emphasis added). While this endogenisation may be necessary to explain the rightward shifting of the (long run) demand curve, it does not change the fact that there is a demand curve that shows the usual characteristics, i.e. that is downward sloping.

increasing the cost of maintaining this quality.<sup>21</sup>

The cost of providing the site at a quality  $q$  can be assumed to vary with the specific features of a site. It may be much more expensive to make archeological excavations available to visitors than providing visits to, for example, a medieval castle.

Furthermore, let  $c(X, q)$  denote the average cost per visit, depending on the total number of visits  $X$  with  $X = nx$ , and on the quality of the site.<sup>22</sup> In addition to  $c_q > 0$ ,  $c_{qq} \geq 0$  and  $c_X \geq 0$ , we will assume that the business of serving visitors does not exhibit increasing returns to scale, such that  $c_{XX} \geq 0$ .

To visit the site, visitors may have to incur a cost independently of a possible admission fee, e.g. for travel, accomodation etc. (cf. Clawson and Knetsch (1966, p. 43 ff.)). This cost, of course, is earned income for travel agents, transportation firms, hotels and catering businesses. If all these sectors (and the rest of the economy) are perfectly competitive, the cost incurred by visitors equals the social cost of the resources they have to use to visit the site. Thus we would not have to consider side-effects for our partial equilibrium analysis. In other words, we do neglect possible spill-over effects in the form of income to local businesses from people visiting the site.<sup>23</sup> Under this assumption, we regard  $v(q, x)$  as average valuation net of the cost of visiting the site.

The optimal use of this stock of cultural heritage, now, is given by the solution to the following maximisation problem:

$$\max_{q,x} nx [v(x, q) - c(nx, q)] - m(q) \tag{1}$$

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<sup>21</sup>This assumption implicitly defines a capacity threshold that divides the range where the consumption of quality is nonrivalrous from the range where an additional visitor leads to congestion. Thus, quality is like a club good that can be consumed by an additional user without additional cost as long as the congestion threshold is not reached.

<sup>22</sup>If, for example, the site can be visited only with guided tours, the cost for serving one visitor is higher than in the case where visitors can just wander around.

<sup>23</sup>Of course, this assumption may seem critical because the positive external effects that the use of cultural heritage may have on the local economy are a main argument in favour of public support. These effects, however, presuppose imperfections such as, for example, an imperfect mobility of factors of production, such that the export of services (which is, in essence, what happens if visitors from outside the region use the facilities of the local economy) increases the welfare of the local economy. However, this export of services does not necessarily depend on the fact that there is some cultural heritage around, unless the possibility to visit historic sites is a crucial element in the demand for touristic services. Additionally, these spillovers can often be found to be naively exaggerated. One has to keep in mind that, for example, business for local hotels can be counted as a benefit from the availability of a historic site if and only if the income that is earned in this sector could not have been earned in other sectors or other regions of the economy (see also page 7 above).

The first order condition is given by

$$n [v(x, q) - c(nx, q)] + nx [v_x - nc_X] \stackrel{!}{=} 0 \quad (2)$$

and

$$nx [v_q - c_q] - m_q \stackrel{!}{=} 0 \quad (3)$$

For a straightforward interpretation of equation 2 we rearrange terms to get

$$v(x, q) + xv_x = c(nx, q) + nxc_X \quad (4)$$

This condition simply requires that at the optimum number of (individual) visits, the *marginal* value to each visitor must equal the *marginal* cost of serving an additional visitor.<sup>24</sup>

Equation 3 requires that at the optimum level of quality, the cost of a marginal variation of quality must be equal to the change in individual valuation net of the change in the cost of serving a visitor, summed up over all (i.e. the optimal number of) visits. Note that a quality above the minimum level  $q = 0$  should be provided only if the increase in average valuation is not less than the increase in average cost of serving a customer, resulting from a marginal increase of quality. More specifically, at  $q = 0$ ,  $v_q > m_q + c_q$  must hold.<sup>25</sup> This condition mirrors the public good character of the quality of a historic site that is consumed in a nonrivalrous way and in equal amounts by all visitors. While the number of visits can, in principle, differ among individuals (though homogeneous individuals will each make an identical number of visits), the amount of quality consumed by each visitor must necessarily be the same. Therefore, the aggregate willingness to pay for a marginal increase in quality should equal the marginal cost of quality.

The first order condition implicitly determines optimum values  $x^*$  and  $q^*$ . It is optimal to convert and provide the site in the first place, however, only if the benefits that can be derived from the consumption of this piece of cultural heritage outweigh the costs of providing the service. Normalising the value of the site in the next best alternative to zero, the necessary condition for the development of the site is given by

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<sup>24</sup>The marginal value to an individual visitor  $\partial[xv(x, q)]/\partial x$  is determined by two effects: the average value of a visit ( $v(x, q)$ ) and the change in average value over all visits ( $xv_x$ ). Marginal cost is determined analogously.

<sup>25</sup>An interior solution additionally requires  $nx[v_{qq} - c_{qq}] < m_{qq}$ . Given  $c_{qq} \geq 0$ , a sufficient condition for an interior solution is that  $v_{qq} < 0$ , i.e. that the increase in quality leads to an increase in the average valuation of one visit, but that this increase is diminishing with an increase in quality.

$$nx^* [v(x^*, q^*) - c(nx^*, q^*)] - m(q^*) \geq 0 \quad (5)$$

If condition 5 does not hold, the provision of the site is socially undesirable.<sup>26</sup>

### 3.2 Profit-maximising supply of cultural heritage

Now let us consider a situation where a profit-maximising supplier provides the service of “visits to the historic site”. This provider “sells” visits to the consumers, i.e. he charges an admission fee for visiting the site. The admission fee, of course, affects the number of visits. The provider, being the sole supplier of this specific site, takes into account the effects of a change in the number of visits he sells on the price he can charge for admission.<sup>27</sup>

An individual visitor will make visits up to the point where his valuation of this additional visit equals the admission price. Thus, the number of visits at price  $p$  is implicitly defined by

$$p \equiv v(x, q) + xv_x, \quad (6)$$

i.e. by the equality of price (representing the marginal cost of a visit) and marginal valuation of the visit (representing the marginal willingness to pay). In other words,  $v(x, q) + xv_x$  denotes an inverse demand function for visits to the site.

The maximisation problem for the provider, thus, is given by

$$\max_{q,x} nx [v(x, q) + xv_x - c(nx, q)] - m(q) \quad (7)$$

and the first order condition by

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<sup>26</sup> If, in addition, we want to model other benefits from the availability of the site (e.g. the benefits that can be attributed to “option demand”) this condition must be modified to

$$nx^* [v(x^*, q^*) - c(nx^*, q^*)] - m(q^*) \geq -B$$

with  $B$  denoting the additional benefits that are independent from the valuation of visitors. If there are external benefits that depend on the level of use, this affects the optimum number of visits and, thereby, possibly the optimum quality.

<sup>27</sup> Because the historic site can be seen as unique in the way that the same “experience” to the visitor cannot be provided by any other site, the provider of the service is able to behave like a monopolistic supplier. Of course, different historic sites (or, more generally, different parts of the cultural heritage) may be regarded as close substitutes, such that the situation could be aptly described as one of monopolistic competition, although in some cases the cost of substitution may be large (e.g. if consumers have to incur travel costs).

$$n[v(x, q) + xv_x - c(nx, q)] + nx[2v_x + xv_{xx} - nc_X] \stackrel{!}{=} 0 \quad (8)$$

and

$$nx[v_q + xv_{xq} - c_q] - m_q \stackrel{!}{=} 0 \quad (9)$$

Rearranging terms, we get from equation 8

$$v(x, q) + 3xv_x + x^2v_{xx} = c(nx, q) + nxc_X \quad (10)$$

A comparison of equations 10 and 4 shows that, with decreasing average valuation, the profit maximising number of visits is below the welfare maximising number of visits. For any given  $q$  and at a given level of  $x$ , the impact of a change of  $x$  on costs is the same in both cases. With  $v_x > 0$ , marginal revenues are always lower than marginal willingness to pay. The value of  $x$  for which marginal revenues equals marginal cost, therefore, must be lower than the value at which marginal willingness to pay equals marginal cost. Thus, profit-maximising providers tend to sell less than the optimal number of visits.

Given that the value of  $x$  that maximises equation 7 at a given  $q$  is smaller than  $x^*$ , a comparison of equations 9 and 3 shows that profit maximising providers of visits have an incentive to reduce quality unless an increase in quality results in a sufficient decrease of the price elasticity of demand. If  $v_{xq}$  is positive and sufficiently large, i.e. if by providing a high quality, the suppliers can make demand for visits sufficiently less price elastic, then there may be an incentive to provide a higher than optimal quality.

This becomes obvious in the case where it is welfare-maximising to provide the lowest possible quality  $q^* = 0$  resulting from  $v_q < c_q$ . In this case, a sufficiently high and positive  $v_{xq}$  can create an incentive to set  $q > 0$ , i.e. a suboptimally high quality.

Let us denote the profit-maximising choices of  $x$  and  $q$  as  $\bar{x}$  and  $\bar{q}$  respectively.

Given a suboptimal number of visits and a suboptimal quality, the sum of consumer and producer surplus is less than with  $x^*$  and  $q^*$ . There may exist sites for which the overall condition of equation 5 holds, but for which

$$n\bar{x}[v(\bar{x}, \bar{q}) - c(n\bar{x}, \bar{q})] - m(\bar{q}) < 0, \quad (11)$$

i.e. the sum of consumer and producer surplus, given profit maximising provision of visits to the historic site, is less than the cost of providing the site at all. From a welfare-



maximising point of view, even if provision of these sites combined with optimal use would be desirable, these sites should not be provided by a profit-maximising supplier.

If the decision to provide the site is made by this profit-maximising supplier, he will look not at the sum of producer and consumer surplus, but on the profits he can expect from running the site. Because profit is necessarily below the aggregate welfare, a profit maximising producer may decide not to convert the site despite the fact that it would be worthwhile to do so, even given a suboptimal number of visits and a suboptimal quality.

To sum up the results of this subsection: if a profit maximising provider decides whether to develop a historic site for the purpose of selling visits to “consumers”, and on the quality and the admission fee, then

- the profit maximising admission fee will reduce the number of visits below the socially optimal level
- the quality provided will be too low unless a high quality makes the demand for visits sufficiently less price elastic, in which case the quality provided may be too high; and
- the (potential) producer may decide against the provision of the service, even if it were socially optimal to develop the site for visitors.

### **3.3 Supply under a zero-profit restriction**

One may suspect that the suboptimality of private provision of the site results from the profits earned by the providers, and that regulation by imposing a zero-profit restriction may generate a welfare maximising provision.

Imposition of a zero-profit condition entails several problems: If the provider of the site operates under a zero-profit condition, then a unique combination of quality of the site and number of visits that is chosen under the restriction that zero-profits are earned does not necessarily exist. In this case, the preferences of the person who decides about

the admission policy of the site will become important.<sup>28</sup>

Thus, any restriction on the allowed profits must be accompanied by an objective set for the managers of the site by the regulatory body. To be enforceable, this objective must be cast in terms of variables that are observable by the regulator. Thus, it is highly impractical to require the management of the site to pursue the aim of welfare maximisation subject to the restriction that earned income must cover the costs of providing the service.

In any case, if we preclude price discrimination, the condition that costs must be covered by earned income simply means that admission fees equal average total cost, i.e. each visitor is charged

$$p = c(nx, q) + \frac{m(q)}{nx} \quad (12)$$

Given the fact that the willingness to pay for the marginal visit must equal the admission fee, this translates into

$$F(x, q) \equiv v(x, q) + xv_x - c(nx, q) - \frac{m(q)}{nx} = 0 \quad (13)$$

The restriction of equation 13 implicitly defines a functional relationship between  $x$  and  $q$ <sup>29</sup> that serves as the restriction for any objective function the management of the site may have.

Suppose, for example, that the management wants to maximise the number of visits. We thus need to maximise  $x(q)$  by choosing  $q$ . It becomes obvious that quality in this case is only instrumental to the end of attracting as many visitors as possible. We can

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<sup>28</sup>For example, one could imagine that the decision maker prefers quality over quantity. This preference can have several reasons. For example, the director of a museum or a historic site is interested in good standing among his peers. Therefore he designs his services for other experts rather than for the “consumers” of cultural sites. In this case, the choice can be expected to be the maximum quality that can be sustained when costs must be covered by earned income. On the other hand, the decision-maker could be interested in maximising the number of visits. The result then will be biased towards the number of visits. Further, quality would only count to the extent to which it increases the visitors’ valuation more than it increases the cost of maintaining the service. Of course, preferences of managers may be important also in the case of profit maximising supply if managers are free to pursue non profit-maximising objectives. However, market forces may require managers to maximise profits regardless of their individual preferences so that the assumption of profit maximising behaviour can be regarded as a justified simplification.

<sup>29</sup>The necessary and sufficient conditions for the existence of an implicit function  $x(q)$  that satisfies  $F(x(q), q) = 0$  in the neighbourhood of a point  $(x_0, q_0)$  are that the partial derivatives  $F_x$  and  $F_q$  are continuous and that  $F_x$  at  $x_0$  is unequal to zero (see Chiang (1984, p. 204 ff)).

determine the derivative  $dx/dq$  according to  $dx/dq = -F_q/F_x$  and set this derivative equal to zero (which means  $F_q \stackrel{!}{=} 0$ ). The first order condition then is given by<sup>30</sup>

$$nx [v_q + xv_{xq} - c_q] - m_q \stackrel{!}{=} 0 \quad (14)$$

which differs from the condition of equation 9 with regard to the value of  $x$ .<sup>31</sup>

Analogously, if the objective is to maximise quality, the solution to  $\max_x q(x)$  is found by solving

$$2v_x + xv_{xx} - nc_X + \frac{m(q)}{nx^2} \stackrel{!}{=} 0 \quad (15)$$

Neither of these conditions matches the conditions for the welfare-maximising provision of visits. Either optimal quality or optimal quantity can result by chance, but  $x^*$  and  $q^*$  will never be reached simultaneously.

### 3.4 Supply with a fixed-cost subsidy

The main problem with regard to the welfare-maximising provision of visits to the site seems to result from the fact that, with marginal cost pricing, the earned income does not fully cover the cost of providing the site at a quality  $q$ . This can most easily be seen in the case where the marginal cost of providing visits is constant and, therefore, equal to the average cost ( $c_X = 0$ , i.e. the change in average cost, equals zero). In this case, all visitors with a willingness to pay not less than the average cost of serving a visitor (denoted by  $\bar{c}(q)$ ) should be admitted. If tickets are priced at  $\bar{c}(q)$ , however, the earned income will not suffice to cover  $m(q)$ . In other words, the provider of the site will not benefit from the difference between the average valuation per visit and the admission fee per visit. This difference will count, however, in the welfare judgment as a counterbalance to the resources spent for making the site available at a quality  $q$ . Furthermore, to the extent that this difference increases with an increasing quality, quality should be raised up to the point where the marginal increase in this difference (summed up over all visitors) equals the marginal cost of increasing quality (cf. the optimality condition in equation 3). Again, if the provider does not benefit from this increasing valuation, he lacks the incentives to invest into quality.

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<sup>30</sup>Note that

$$\frac{dx}{dq} = -\frac{v_q + xv_{xq} - c_q - m_q/(nx)}{2v_x + xv_{xx} - nc_X + m(q)/(nx^2)}.$$

<sup>31</sup>The different values of  $x$  result from the fact that in this case  $x$  is determined by  $x(q)$ , while in the case of the profit maximising provider  $x$  and  $q$  were determined simultaneously by solving equations 8 and 9.

Therefore, one could be tempted to expect optimal provision of visits to a historic site if the provider is told to care only for the number of visits while getting a subsidy for his investment into quality. This is to say that only the cost of serving visitors but not  $m(q)$  needs to be covered by earned income.  $m(q)$  will be subsidised, for example, out of lump-sum taxes collected from all potential visitors to the site. It is easy to see, however, that this regulation does not guarantee a welfare maximising use of cultural heritage. The restriction under which the management tries to maximise  $x$  simply reduces to

$$\tilde{F}(x, q) \equiv v(x, q) + xv_x - c(nx, q) = 0, \quad (16)$$

and the respective first order condition for an interior solution is given by

$$[v_q + xv_{xq} - c_q] \stackrel{!}{=} 0 \quad (17)$$

Consider again a situation where  $v_q < c_q$  and where the lowest possible quality should be provided. Again, if  $v_{xq}$  is sufficiently high, then in this case,  $q > 0$  will be chosen, which is clearly suboptimal. Furthermore, if  $v_q - c_q < m_q$  at  $q = 0$ , then  $q = 0$  is the welfare maximising solution, although a provider under this kind of regulation has an incentive to provide  $q > 0$ . Not surprisingly, promising a subsidy for investment in quality creates a bias in favour of a suboptimally high quality.

As a result, we can state that no combination of restrictions on profits, even if combined with a subsidy for costs not covered by earned income, will necessarily guarantee the first best outcome. In the case of constant marginal cost of serving visitors, for example, an optimal solution would require a regulator to

- specify the quality to be provided
- require the cost of serving visitors to be covered by earned income
- promise to subsidise the deficit that results from provision in accordance with the first two requirements.

If the marginal cost of serving visitors is increasing, the requirement of visiting costs being covered by earned income must be replaced by the requirement to price admissions according to marginal cost. To specify the ticket price, the regulator would have to know the exact demand function for visits to the site.

## **4. Optimising the Use of Cultural Heritage: Some Conclusions**

The preceding subsections have shown in which way different institutional arrangements governing the provision of the good “cultural heritage” (or more specifically the service that is offered to users) affect the use of cultural heritage and thereby the aggregate welfare that is created by this use. The most important lesson to learn is that, unless a public policy maker has nearly perfect knowledge of cost structures and demand functions (i.e. of the valuation potential users put onto the stock of cultural heritage), a welfare maximising, first-best solution is unlikely to be reached. Except for this rare case, regulated provision necessarily yields second best outcomes. Consequently, different regulatory schemes may be compared according to the welfare loss they imply.

There may be a case for granting the monopoly right to provide the services to a private supplier with or without regulation. There may as well be a case for free access (i.e. a zero entry price) with all costs being subsidised out of tax payments (either from taxes collected from all individuals, or taxes collected from local businesses).

All these schemes affect the actual use of a cultural heritage good as well as the quality of the services provided. The extent to which a stock of cultural heritage is used is the main determinant for the realisation of direct benefits, which may depend on the quality. Since the flow of benefits to the users that results from quality accrues to them in a non-rivalrous way, quality has certain features characteristic of a public good. Therefore, if price discrimination is impossible and the cost of providing a specific quality has to be borne by all users to the same extent in the form of a premium on the admission fee for every visit, there exists a welfare loss from suboptimal use.

If, in an extension of the model, individuals are heterogeneous, this benefits those users whose consumer surplus is higher than the premium they have to pay. However, this same effect harms (potential) users who are excluded despite the fact that their willingness to pay exceeds the marginal cost of admission. Thus, higher quality redistributes benefits to those who would be willing to pay more than the admission fee for visiting the site.

The importance of actual use may increase if repercussion effects of use on valuation are taken into account, i.e. if the effect of actual use on future valuation and, thus, future demand is incorporated. In this case, a lower number of users does not only mean that less people benefit from the use of cultural heritage, but also that a potential increase in the valuation put onto this stock will not be realised.

The importance of the level of use increases also if there are consumption externalities,

i.e. if non-users benefit from the number of visits. In this case, there should be a subsidy to admission fees, i.e. visitors should pay less than the marginal cost.<sup>32</sup>

The analysis presented above could be extended by looking at alternative pricing schemes. Because quality can be used in a non-rivalrous way, two part tariffs may yield better results than pricing of the individual admissions. (Potential) users could, for example, be offered a ticket that allows for as many visits as desired within a given time period. This reduces the marginal cost of an additional visit to zero for each holder of the ticket (or more precisely, to the opportunity cost of visiting the site in terms of the foregone utility from pursuing other activities). Even in this scenario, however, all (potential) users, whose aggregate benefit from all uses they will make is less than the price of the ticket, will be excluded, even if they could be served at an additional cost that is less than their willingness to pay. This problem arises only in the case of heterogeneous individuals, but then again the possibility of price discrimination is of importance.<sup>33</sup>

Beside the direct benefits realised by actual users and the external benefits that depend on the level of use, there may be an additional case for public funding due to the potential externalities from the *existence* of cultural heritage. If such externalities do exist, then non-users should contribute to the provision, and a site should be converted even if the welfare generated from direct use is not sufficiently high (see footnote 26).

Whichever institutional arrangement (of all those arrangements that are second best, given the additional restrictions imposed on quality, costs and profits) is optimal depends on the sensitivity of (potential) users to admission costs and on the cost of providing access to the cultural heritage and serving individual users. Without a good knowledge and understanding of the costs and benefits of the use of cultural heritage, optimising the use of cultural heritage by selecting the mechanism or the institutional arrangement

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<sup>32</sup>This can easily be shown in a simple extension of the basic maximisation problem 1: Assume that there are external benefits that depend on the number of visits  $nx$ , denoted by  $e(nx)$  with  $e' > 0$ . In this case, the respective first order condition is given by

$$n[v(x, q) + e' - c(nx, q)] + nx[v_x - nc_X] \stackrel{!}{=} 0$$

and equation 3. Rearranging terms yields

$$v(x, q) + e' + xv_x = c(nx, q) + nxc_X$$

This condition results in an optimal  $x > x^*$ , which requires lower admission fees.

The other scenarios can be modified accordingly.

<sup>33</sup>In the case of homogeneous individuals, a first best solution would be possible if the flat fee is set equal to  $m(q)/n$ , and tickets are priced at marginal cost. To achieve the optimal quality and the optimal number of visits, however, one has to know the exact shape of the function  $v(x, q)$ .

that entails the smallest difference to the welfare maximum, must remain futile and meaningless.

On the other side of the same coin, however, we find the importance of understanding the welfare effects resulting from institutional arrangements for the design of studies that are intended to elicit the value of a specific preservation project. Particularly in cases where public funding is involved in order to correct the distortions that may result from profit-maximising private provision or to account for various externalities, it is important to anticipate the likely level of use (as well as the likely quality that will be provided). In this sense, the institutional arrangement that will govern the use of an asset that could be preserved and become part of the cultural heritage is an important factor of which the preservation decision must take account.

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