The Double Public Good: A Conceptual Framework for "Shared Experience" Values Associated with Heritage Conservation

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Abstract. This paper introduces the double public good model as a representation of the simultaneous externalities that complicate decision making in the cultural heritage sphere. Social welfare is modeled as depending on both public and private benefits of households' production of individual heritage experience, which in turn depends on the stock of historic assets (a public good) and access effort (a private good). The public benefit of private experience arises from "shared experience" that fosters cultural identity and social understandings. The model generates marginal efficiency conditions for the amount of physical preservation, amount of access, and intensity of access. The model highlights the need for dual-level policy making in order to avoid unbalanced heritage preservation efforts that have been of some concern in the literature.

Key words: cultural heritage, efficiency, historic preservation, public goods

1. Introduction

In a recent issue of the *Journal of Cultural Economics*, Françoise Benhamou (1996; see also Benhamou, 1997) asserts that public protection and funding of historic monuments in France has led to an overprovision of those resources from an efficiency point of view. One might make a similar argument for the United States where, though both public preservation projects and involuntary "listing" are less common than in some European countries, federal and local listing procedures do enable private and non-profit entities to reap subsidies (tax credits and tax exemptions) for restoration and preservation of privately-owned historic resources. Most arguments against enhanced preservation incentives focus on this perceived overprovision and cite the high cost of preservation and maintenance, and the lack of sufficient revenue to cover these costs. In response to these cost-benefit arguments, preservationists often justify their activities by focusing on increased economic value (jobs created, increases in property values, and gains in economic growth), but typically offer only referential treatment of nonmarket values (aesthetic, cultural, option, bequest, and existence values).

In this paper we introduce the "double public good" model, which offers a formal presentation of the full spectrum of value, from private market values to social nonmarket values. It is based on a general recognition that many types of cultural assets or activities produce multidimensional nonmarket social benefits, particularly when they serve as communicators of social identity, forces for change, and evidence of cultural continuity. In this sense, it continues a body of work well represented in Hutter and Rizzo (1997).[1]

While the double public good concept has applicability beyond historic preservation, we present it in the preservation context for the sake of concreteness, and because the model seems particularly germane to that purpose. The most notable characteristics of the model thus presented include:

- A formal incorporation of *social* heritage value with *private* satisfaction derived from preserved historic resources.
- A focus on the benefits of historic preservation, modeling simultaneous *supply-side* and *demand-side* externalities.
- An adaptation of the "club-goods" approach to model the interactive impact of both *physical* preservation and *public accessibility*, by which we mean broadly the physical and intellectual capacity to experience historic built resources.

On this basis, the double public good model sheds new light on complex resource valuation issues acknowledged by practitioners of preservation, but typically not recognized by economists. We show why and in what dimensions the social welfare may be at risk if we pursue policies without accounting for the *simultaneity* of externalities, that is, the "double public" nature of the benefits side of the evaluation equation. We hope that this framework will eventually inform the public decision-making process, thereby avoiding undesirable and irreversible resource losses.

2. The Basics of the Formal Model

We define historic built resources as tangible construction embodying value that is both historically and socially determined. We model the preserved historic built resource as a pure public good. However, in some cases exclusion may be technically possible, but typically not desirable. In other cases, the nature of the good is such that at some threshold the good becomes rival in consumption due to congestion; although our model does not address congestion explicitly, the possibility of congestion is implicit in some aspects. We embed the analysis of the model of the double public good in a general equilibrium model of social welfare. The model presumes an accounting stance of large enough scope that only net direct consumption and production values are considered, and thus interregional spending shifts, triggered by tourism for example, are excluded as benefits. Not inconsistently, the analysis also presumes an accounting stance consistent with the region to which the historic assets are culturally relevant.

2.1. HOUSEHOLD WELFARE

We assume a population of n households with well-behaved utility functions: $u^1 \ldots u^i \ldots u^n$. The ith household utility function is specified in the following form:

$$u^i = u^i(y^i, x^i, x, H),\tag{1}$$

where

y^i	$=$	private goods consumed by household i
x^i	$=$	private "consumption" of (built) heritage, where $x^i = g^i(H, a^i)$
$g^i(H, a^i)$	$=$	the ith household's production function for heritage experience
H	$=$	stock of preserved historic capital
a^i	$=$	physical and intellectual access by household i
$x = \sum_{j=1}^n x^j$	$=$	the aggregate level of joint consumption, representing the magnitude of "shared experience", with $x^j = g^j(H, a^j)$.

The model specifies that an individual household's utility depends on private consumption of private goods, private consumption of heritage via historic preservation, the collective use of the historic resources by other members of the population, and possibly additional non-use values. Koboldt (1997) distinguished use and non-use values, and proceeded to focus on efficiency with respect to use. Our model elaborates in a different direction, by explicitly separating "shared experience" from other public good aspects that are even more purely non-use. Let us now discuss more thoroughly each of these critical elements.

2.2. PRIVATE "CONSUMPTION" OF HISTORIC PRESERVATION

Individual "consumption" (and consequently the aggregate consumption externality) will depend, according to the household production function g^i, on services flowing from the stock of historic resources H (a public good) and on access activity a^i (a private good). Consistent with a broad interpretation of Koboldt (1997), we intend a very inclusive definition of "consumption" involving not only use in the sense of direct visitation, but also more remote, indirect or passive experience, for example via books, television, or various educational channels. Both direct and indirect "uses" are produced by a combination of the existence of historic assets and access efforts.

The stock of historic assets H plays the traditional role of capital in the household production function. In the usual somewhat unsatisfying but necessary way, it abstracts from the real-world array of types and qualities of assets by representing

the total as one aggregate measure, and it also ignores dynamic aspects of capital. Despite these simplifications, the variable effectively represents the essence of historic assets as a productive factor in an economic activity.

The household access variable a^i represents all the activities that make both direct and indirect experience of H possible. It, too, is therefore an abstract aggregation of numerous real-world factors including private travel activity; investment and services enabling visitation; interpretive services; information via the media, and marketing; and any other activity helping transform an historic asset into an historic experience. We model this activity as a private good distributed among households either by household choice or by public managers, although it is true that some elements (such as those involving information) could have a quasi-public character.

Our analysis assumes the two inputs H and a^i are complementary in the production of x^i. Based on this complementarity, we posit diminishing marginal productivity of each input alone, since a fixed stock of assets will constrain the productivity of additional access, and *vice versa*. With more and more intensive "use" of a fixed stock of assets, there is not only the likelihood of experiential saturation, but also the possibility of congestion. In the other direction, marginal additions to the stock of assets would, at least past some point, begin to stretch the access inputs too thinly. In addition, our abstract variable H is in reality a heterogeneous set of assets that could be ordered according to their "usefulness" in producing historic preservation experience; presumably, a rational planner would protect H in order of usefulness, implying diminishing marginal returns the farther the protection goes. Note that diminishing marginal returns to each input alone do not rule out increasing returns in the overall production function g^i, nor are they inconsistent with "cultural addiction" or "learning by consuming" phenomena that might be relevant but that require a dynamic model (see for example, Becker and Murphy, 1988; Lévy-Garboua and Montmarquette, 1996).

2.3. SHARED EXPERIENCE VALUES

The idea of "shared experience" is that as more households use these resources or as they use them to a greater collective intensity, they are able to integrate symbolic meaning into their lives as members of a community or culture. This model assumes that the proliferation of historic knowledge and experience leads to common heritage value, social identity, and cultural continuity and, hence, community value. Therefore, each household benefits from the collective experience of the historic resources regardless of whether or not it directly consumes the resource (i.e., even if its own x^i is zero, it benefits so long as the household's neighbors contribute to generating this social value).

Although the specific formulation of "shared experience" as "summed experience" is a bit arbitrary, the general purpose is motivated by well-established understandings in anthropology and cultural studies. For example, the symbolic

anthropologist Clifford Geertz asserts that clusters of symbols are "historically created systems of meaning in terms of which we give form, order, point and direction to our lives" (1973, p. 52). Geertz argues that the symbol is a learned "information source" external to the individual organism, constituting "meaning" which is passed from age to age, representing a continuum of thought or social mores. The basis of our model is that historic built resources constitute important instances of such enduring and socially uniting symbols, and it is at least plausible to use the sum of individual experience as a proxy for the magnitude of this symbol sharing.

2.4. ADDITIONAL NON-USE VALUES

In addition to the "shared experience" externality, the model allows the further possibility that preservation generates individualistic non-use values that are independent of any actual access, consumption, or sharing, but that are supplied jointly to all households by the existence and magnitude of H. H entering the utility function independently as a fourth argument represents this possibility. In keeping with the usual typology (for full discussion see, for example, Mitchell and Carson, 1989) these values could include option value, bequest value, and existence value accruing to individuals. Although elaboration on the likely nature of these values in the context of historic preservation is beyond the scope of this paper, and indeed their inclusion is lateral to our main purpose, the model nevertheless is constructed to allow for them.

2.5. PRIVATE CHOICES AND PUBLIC EXTERNALITIES

To reiterate, the choice variables in the model are thus y^i, a^i, and H. The first is a private good in the classic sense. The second variable, which we call access, is a household level choice that would depend on some mix of private incentives and public programs. The third variable, representing the stock of preserved historic resources, we model as a pure public good (though one could argue for another approach). The combination of preservation and access as choice variables is what generates the "double public good" label for the model. The publicness of the H resource implies that, even if some level is provided on the basis of private incentives, private markets would not provide the welfare-maximizing level of preservation from the supply side. At the same time, the fact that households choose their cultural consumption levels x^i via a^i, and that those choices generate the social sharing externality, means that individualistic consumers will underallocate to a^i on the demand side. The combination of these two public good factors, with market failure from two directions, raises the special issues that motivate the model.

3. Socially Efficient Allocations

To motivate the inquiry, we ask the question: At what level of historic preservation is social welfare maximized? To answer we postulate a Bergson-Samuelson social welfare function W, whose arguments are individual household utility functions, although the exact functional form need not be specified. Let:

$$W = W[u^1(\cdot), u^2(\cdot), \ldots, u^n(\cdot)] \tag{2}$$

with

$$u^i = u^i[y^i, x^i, x, H] = u^i[y^i, g^i(a^i, H), \sum\nolimits_{j=1}^n g^j(a^j, H), H]. \tag{3}$$

The model is used to characterize optimal resource allocations, and to suggest whether more historic preservation would likely be better or not, but it does not specifically quantify the change in social welfare. In its most general form, the objective function W is maximized subject to a production possibilities constraint, $F(y^1..y^n, a^1..a^n, H) = 0$, and the solution to this problem would be characterized by $2n + 2$ first-order necessary conditions. For simplicity, in our focus on efficient resource allocations, we set aside distributional issues by supposing homogeneous households with identical utility functions, access, and consumption levels, i.e.,

$$u^i = u, y^i = y, g^i(a^i, H) = g(a, H), \text{ and } a^i = a \text{ for all } i = 1 \ldots n. \tag{4}$$

In this case, the first-order conditions condense to:

$$W_y = W_i u_y + \lambda F_y = 0 \quad \text{for all } i = 1 \ldots n \tag{5}$$

$$W_H = n W_i [u_{x^i} g_H + n u_x g_H + u_H] + \lambda F_H = 0 \quad \text{for all } i = 1 \ldots n \tag{6}$$

$$W_a = W_i [u_{x^i} g_{a^i} + n u_x g_{a^i}] + \lambda F_{a^i} = 0 \quad \text{for all } i = 1 \ldots n \tag{7}$$

$$W_\lambda = F(y, H, a) = 0. \tag{8}$$

In the usual way, these conditions combine to generate tangency conditions for Pareto-optimality, including: a *preservation condition* for the optimal resource stock (H) in terms of the private good, an *access condition* for private access (a) in terms of the private good, and an *intensity condition* for access relative to preservation. While these conditions will indicate what is required to be on society's utility-possibilities frontier, they ignore distributional impacts of moving to or among the infinite number of points on that frontier. By arranging the conditions to put utility elements on the left and technological elements on the right, and then stating them in terms of marginal rates of substitution (*MRS*) and marginal rates of transformation (*MRT*), we have first the *preservation condition*:

$$\frac{n(u_{x^i} g_H + n u_x g_H + u_H)}{u_y} = \frac{F_H}{F_y}, \tag{9}$$

or in simplified form,

$$nMRS_{H,y}^{x^i} + n^2 MRS_{H,y}^x + nMRS_{H,y}^H = MRT_{H,y} \,. \tag{10}$$

This preservation condition indicates that three elements make up the total marginal rate of substitution between preservation and the private good ($MRS_{H,y}$). The first element on the left-hand-side of the equation represents the private benefit from increased private consumption of preserved resources due to an increased level of the provision of the services these goods provide; the publicness of H as a resource means individual benefit is multiplied by n in the aggregate. The second element on the left-hand-side is the consumption externality or the community benefit from shared consumption of the services, in this case caused by increasing the level of preserved resources (H); the n^2 factor in this term reflects the "double public" phenomenon. The third term represents the public non-use value of preservation efforts. In general terms, the preservation condition tells us that the marginal benefit, including both private benefit and social benefit, from one more unit of investment in preservation should equal the marginal cost of that unit of investment. Interestingly, the left-hand-side, which represents benefits, includes a term that increases geometrically with respect to the number of participating households (though congestion factors could offset such exponential forces).

The second Pareto-optimal condition is the *access* condition which, in its simplified form, is

$$MRS_{a,y}^{x^i} + nMRS_{a,y}^x = MRT_{a,y} \,. \tag{11}$$

Here, the marginal rate of substitution between specific access activities and the purely private good involves both private and public benefits. Given the interdependent effects of preservation and access on benefit as well as cost, conditions (10) and (11) must be met simultaneously for the attainment of the first-best, top-level optimum. When they are, then by implication resource allocation will also satisfy the *intensity* condition:

$$n(MRS_{a,H}^{x^i} + MRS_{a,H}^x + MRS_{a,H}^H) = MRT_{a,H} \tag{12}$$

whose interpretation is straightforward. The left-hand-side includes terms representing the relative values of a and H in producing both private and shared experience via $g(a, H)$, and a term representing the non-use value of H relative to a. The publicness of H as a resource is reflected in the n multiplier in the left-hand-side of (12). If non-use values are significant, more investment in H is appropriate even without more a, implying a lower access intensity. Further discussion of the issue of the optimal mix of a and H is left to the graphical development in Section 4.

Although households' market decision-making has not been modeled explicitly here, a key point is that if the provisional decisions were left to the market, outcomes would not be optimal due to the market's neglect of social effects and

spillovers. On the demand side, individuals would take H as exogenous and would choose their mix of y and a by weighing prices against individualistic utility, ignoring the "sharing" externality; the second left-hand-side term of (11) would be mostly ignored in decision-making. On the supply side, those in a position to provide H normally would find little market incentive to do so; the almost completely public nature of the left-hand-side of (10) implies that it would be far from satisfied with pure dependence on markets. Furthermore, underallocation here would exacerbate underallocation to a. The only mitigating factor here is the possibility that in certain cases an entrepreneur could market H and a jointly (for example, preserving a chateau and selling visits). But even this would ignore non-use values, non-excludable aspects of "access", and the compounding value of the number of visitors allowed. Many sites that ought to be preserved, therefore, would not be.

4. A Graphical Representation of the Double Public Good Problem

With this more precise yet necessarily more complex valuation of historic built resources, theory indicates that the market solution would result in underprovision of historic built resources but to a greater extent than would be realized under a single-aspect externality analysis. The idea that both demand behavior and supply generate externalities and that "shared experience" is of value to each individual can be illustrated in a graphical representation. Figure 1 illustrates the externalities in both the provision of H and that of a. The optimality conditions are translated into marginal benefit and cost (MB and MC) terms, using the private good as the numeraire.

The private market provision for both H and a would lead to the consumption level of H^m and a^m. The curve, D1, represents demand with distorted preferences (i.e., lacking acknowledgment of shared experience aspects of the resources) and the MC is the private marginal cost of provision.

If we consider the collective consumption value, the social demand curve would include both private and social benefits as indicated by D2. The positive externalities increase the level of consumption and production that equates to the optimum level. However, note that the n^2 factor implies a geometrically large "publicness" and a geometrically large market failure associated with preserved historic resources.

How these dual market failures affect policy decisions will depend on the relative abilities of H and a to stimulate cultural consumption and the ultimate cost of doing so. This indicates that an analysis should be conducted to determine the relationship between a and H and their combined effect on consumption. We assume that the effectiveness of a depends on H and the value generating potential of H simultaneously depends on a. It is realistic to assume that policies enhancing a (e.g., infrastructure, education, interpretation programs, etc. that facilitate or multiply pre-existing private incentives) increase the value of the services from
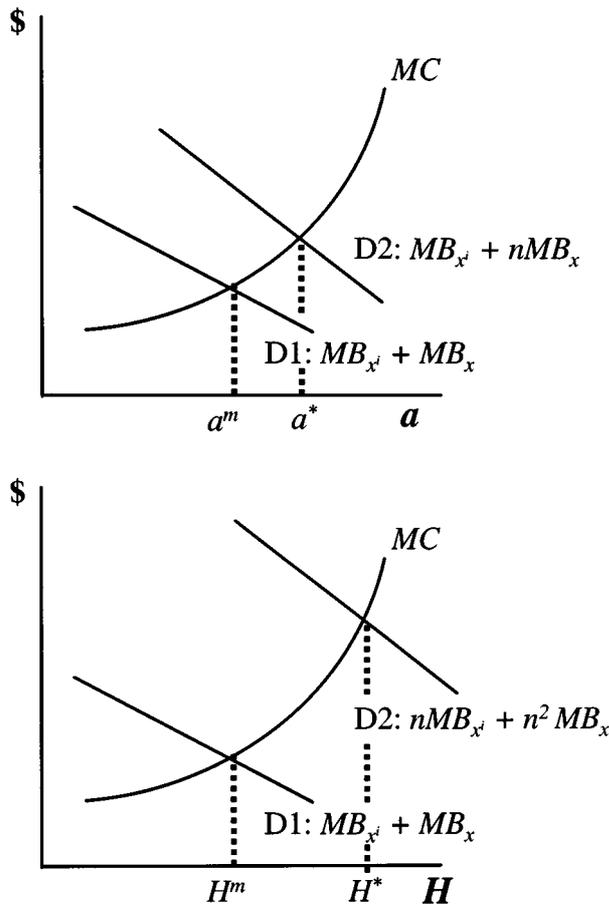
Figure 1. Optimal consumption.

the preserved stock of H, and that providing an opportunity for visiting historic resources by providing H gives substance to any accessibility enhancing programs (a). In this sense H and a are complementary inputs to the production of x. Since a governmental role or other institutional adjustment can consist of two approaches (preservation H and programs to enhance access a), the simultaneity effect of these policy efforts must be analyzed if we wish to arrive at the most cost-effective method of providing for social welfare maximization. The dual decision of preservation (H) and access (a) should occur simultaneously as the two are related in their influence on social welfare. Figure 2 represents this detail of the double public good problem.

Figure 2 gives an adaptation of the "club good" model proposed by Buchanan (1965) to describe the simultaneity of decisions involving club-membership size and the provision of a club good. Figure 2 assumes that net benefits (*NB*) to society encompass all costs and benefits, including all externalities described previously.
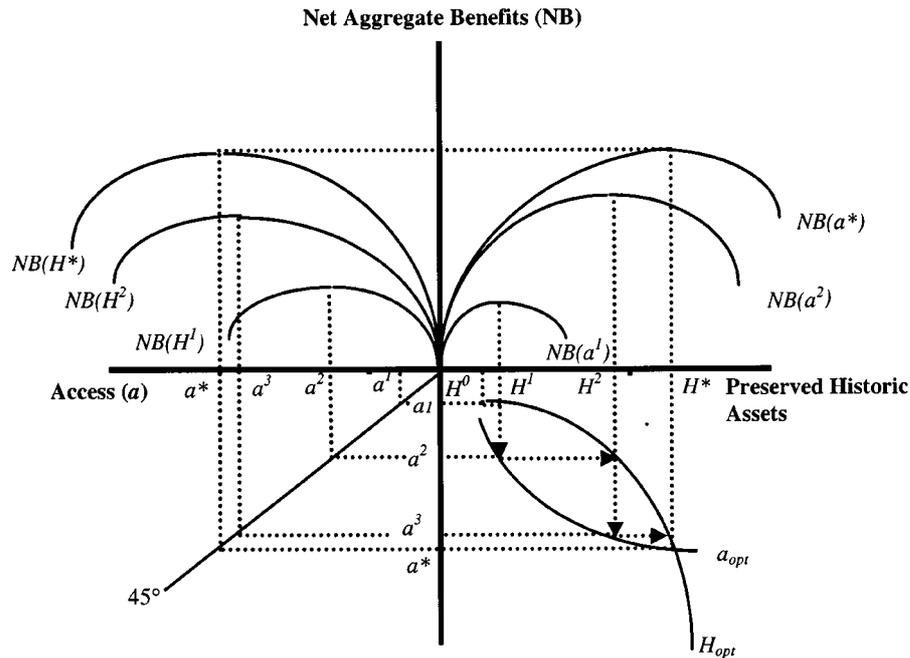
Figure 2. Interdependent policy variables.

The curves in the first quadrant indicate that, given a particular level of a, net social benefits will increase with increasing levels of preserved resources (H) and then at some point will begin to diminish. Increasing a will increase the capacity to generate benefits from H, both private and external. The increasing level of H also enhances the effectiveness of a, but this enhancement effect would eventually diminish unless a increases to promote higher levels of H.

Quadrant two illustrates that given H, net benefits will also increase with increasing a until diminishing net returns set in. Again, H is the opportunity which a can exploit, but eventually returns to a will diminish unless we allow H to increase. The fourth quadrant illustrates two curves: H_{opt} and a_{opt}. The curve labeled a_{opt} indicates that as H increases, the optimal level of a is also increasing. This quadrant indicates that greater preservation investment should be accompanied by, for example, increased education aimed at the interpretation of these new resources. At some point, however, the H will be so great that the returns from increasing a will diminish. Likewise, as a increases the optimal level of accompanying H would increase to provide the opportunity for consuming the resources. However, ultimately the availability of historic resources that can be preserved to create a stock of preserved resources is fixed at the amount of antiquated resources available for preservation efforts. Hence, H_{opt} cannot surpass this limit, and probably approaches it asymptotically as marginal preservation costs skyrocket near the limit.

The assumptions of diminishing returns and a fixed limit to H imply that H_{opt} is a concave function of a and a_{opt} is a concave function of H.

The intersection of the two curves in the fourth quadrant indicates that there exists a unique solution, which Buchanan called the "full equilibrium", a stable equilibrium where both a and H are simultaneously optimized. Attainment of this full equilibrium could be through an iterative process driven by the complementary relationship between the variables. With reference to the mathematical model, Figure 2 illustrates that decision variables that are interdependent create a situation where one combination of the two will optimize both Pareto-optimal conditions (10) and (11) simultaneously.

Note that the construction of Figure 2 assumes complementarity between a and H, making the equilibrium unique and stable. If we assume that a and H are substitute goods in some ranges, the H_{opt} and a_{opt} curves in the fourth quadrant would be "positively" sloped, introducing the possibility of an unstable and/or non-unique solution. With the two goods framed as inputs to a household production function, however, the more plausible assumption seems to be complementarity, as discussed in Section 2.2.

5. Conclusion

We have developed a model to analyze the implications of multiple, mutually compounding, positive externalities associated with a cultural good, namely historic preservation. Two key elements of the model are: (1) a combination of historic preservation itself and private household access, which are complementary inputs in the production of a cultural experience, and (2) a "shared experience" variable that affects individual and collective welfare.

Within this model, we identified a "double public good" phenomenon and its effect on efficient preservation planning, and we compared it to the general outcome of unregulated markets. The first aspect of publicness is that preserved historic assets are jointly used resources that enter into households' production functions for "experience". The second part of the double public good is that when households apply "access activities" to the public resources to generate experience, they contribute to the public externality of "shared experience" that has its own communal value. Unmanaged markets have very weak tendencies to account for nonmarket or communal values. An individual household in the market system will take historic preservation as given and decide access activity levels so as to maximize its own satisfaction, ignoring the positive social externalities. Private protectors of historic resources also will encounter the classic public goods provision problem, facing either inadequate profit incentives or (for non-profit organizations) underfunding due to free rider issues. The two likely underallocations exacerbate each other. Unsurprisingly, our discussion indicates that market intervention would be necessary to attain social efficiency. What is new is the compounding effect and its implications for public policy.

Given the hypothesized complementary relationship and diminishing marginal returns, combined with an ultimately fixed limit on the possibilities for historic preservation, there exists one combination of preservation and access which satisfies the Pareto-optimality criteria. The double public good model informs us that single-sided policies that concentrate on one variable or the other will not maximize social welfare. The policy approach must be comprehensive if welfare maximization is the goal.

The double public good model is rich with possibilities for future analyses to explore, including:

- A more precise characterization of the complementary relationship of preservation and public access.

- Alternative formulations for the "shared experience" variable, which here was posited as the simple summation of individual experience levels.

- Implications when heterogeneous households are considered. Even setting preference differences aside, an uneven distribution of income would affect private access decisions and introduce new issues into the analysis of the social good. Rich households might willingly subsidize poor households' access, given the "shared experience" externality. Such an analysis would require more explicit modeling of private, budget-constrained demand.

- A dynamic analysis recognizing an important asymmetry between physical preservation and access: physical losses of historic resources normally are irreversible, while short-term deficiencies in access could be corrected later.

- Extensions to other cultural goods with their own particular characteristics. Visual arts, performance arts, museums, and festivals all provide a mix of private enjoyment, private option and bequest values, and collective reference points that enhance social identity, forces for change, and cultural continuity.

- Operationalizing the model for the purpose of incorporating more explicit analysis of benefits into actual decision-making processes.

This last need is the ultimate goal of the entire analysis. One message from the work of Benhamou (1996, 1997) is that a particular element of heritage policy – physical protection via listing – may have been pursued inefficiently out of proportion to the resources available for the complementary efforts necessary for effective "production" of a meaningful built heritage. A clarified view of the nature of such trade-offs and complementarities will facilitate further assessment of the efficiency of how resources are applied to heritage conservation. The purpose of the double public good as a conceptual framework – with its focus on "shared experience" as an element of benefit linked to particular policy choices – is to make a positive step in that direction.

Note

1. For instance, the externality arguments are well summarized by Throsby (1997), Koboldt (1997), and Benhamou (1997). Koboldt presents a formal model of heritage benefits, costs, and optimal resource allocation, while Benhamou questions whether, in actuality, current policy regimes generate an appropriate balance of resource use. Klamer (1997) emphasizes that value is culturally created, and that cultural heritage in particular "depends on dominant values that people share, or on their culture".

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