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TERRITORIAL PLANNING AND TOURISM DEVELOPMENT TAX

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Abstract: An economic model of land taxation involving a local government and a private developer constitutes the theoretical framework in this research. The model hinges around a two-tier approach including both a conservation and an efficiency criterion. The analysis indicates that sustainable tourism calls for the use of land taxation and planning legislation simultaneously geared to the achievement of efficiency and the signaling of the government's commitment to conservation policies. To provide support for the theoretical conclusions, an Italian case study is discussed, showing how the local government chose not to yield to a developer's requests by not changing a norm prohibiting construction near of the coastline.
Keywords: land usage, sustainability, game theory, Sardinia.

Résumé: Aménagement du territoire et développement du tourisme. Un modèle économique des impôts sur la propriété foncière, basé sur la participation du gouvernement local et d'un promoteur de construction, constitue le cadre théorique de cette recherche. Le modèle dépend d'une approche à deux niveaux qui inclut des critères de la défense de l'environnement et de l'efficacité. L'analyse indique que le tourisme durable exige l'utilisation des impôts sur la propriété foncière et des lois de planification qui contribuent à la réalisation de l'efficacité et qui signalent l'engagement du gouvernement à une politique de défense de l'environnement. Pour soutenir les conclusions théoriques, on discute d'une étude de cas italienne qui montre comment le gouvernement local a choisi de ne pas céder aux demandes d'un promoteur en ne changeant pas une norme qui interdisait la construction près de la côte. **Mots-clés:** utilisation de la propriété foncière, durabilité, théorie du jeu, Sardaigne.

INTRODUCTION

Environmental quality is often a key success factor for tourism. At the same time, tourism makes extensive use of natural resources, thereby jeopardizing its long-term viability. To address such a dilemma, from the general notion of sustainable development (SD) tourism scholars have coined the term "sustainable tourism" (ST) that encompasses a set of principles, business methods, and policy prescriptions relevant to the tourism industry (Sinclair and Stabler 1997). However, recent research has advocated the need to reconcile the concept of ST with

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that of SD, by making the concerns of the former adhere more strictly to the tenets of the latter (Collins 1999; Hunter 1997). This paper looks at the issues of tourism development and environmental conservation through the lens of SD principles and assesses the pivotal role that local governments can play in designing policies that make the two perspectives compatible.

A common denominator in the literature on SD is the Bruntland Commission's definition that "SD is development that meets the need of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). Such a mandate affirms the importance of intragenerational and intergenerational equity issues. As far as the former is concerned, "SD places emphasis on providing for the needs of the least advantaged in society" (Pearce, Markandya and Barbier 1989:2). This is particularly relevant in developing countries, where the need to generate income is more likely to lead to a rapid exploitation of the resource base and an uneven distribution of the related profits between foreign investors and host populations. To prevent this, it is generally recommended that local populations and governments be directly involved in the shaping of tourism development activities in association with foreign developers, because locals can better assess the short and the long-term effects of growth. As far as the latter is concerned, intergenerational fairness implies that future generations should receive a fair share of the net benefits supplied by tourism (Hunter and Green 1995). The fact that development is *sustainable* only as long as future generations are fairly treated led to the view that

> …we in the present generation are but the present tenants of the earth, not its absolute owners. As present tenants we have the right to make use of its productivity, but not the right to impair its productivity for its later tenants—the future generations" (Page 1997:586).

In theory, future generations are entitled to just compensation for the current actions that lead to a depletion of natural resource. In practice, doing so requires making difficult judgments about the substitutability of natural capital with physical capital. This is a crucial point in the case of tourism, whose activity relies extensively on the transformation of natural capital into accommodation and service facilities. Thus, this industry faces the particularly difficult challenge to "develop tourism capacity and the quality of its products without adversely affecting the physical and human environment that sustains and nurtures them" (Cronin 1990:13).

It is argued, however, that the WCED definition is too vague to use as a working tool, and often results in ambiguous admonition for policymakers (Norton and Toman 1997). Indeed, the requirement that the needs of the present be met without compromising the ability of future generations to meet their needs, could be satisfied simply by allowing constant consumption over time at no more than a subsistence level. Although such a policy would achieve equity among different generations, it could hardly be accepted as a reasonable target for

public policy, as it may fail to incorporate a notion of dynamic efficiency. In the following analysis, efficiency implies the notion of "non-wastefulness", that is, the possibility that inputs are transformed in a way that leads to an increase in individuals' well-being in a sustainable manner (including consumption above the subsistence level for every generation). Such an increase in individuals' welfare entails a decision on the optimal allocation of scarce resources (such as natural assets) among alternative uses (exploitation or preservation). Thus, the real challenge is to indicate sustainable policies that combine intragenerational and intergenerational equity with efficiency considerations in a mutually compatible manner, taking into account that tourism can never be totally without environmental impacts (Page 1997). As far as intergenerational equity and efficiency are concerned, assessing under what circumstances turning natural resources into capital stock (a hotel) leads to an increase in the well-being of the present and future generations is central. Furthermore, the notion of efficiency is closely linked with that of intragenerational equity when the local populations of the tourism areas are allowed to appropriate a fair share of the net benefits generated by tourism. The theoretical analysis in this article presents a policy measure that enables local governments to retain the surplus from tourism activities when these are run by foreign organizations.

The existing literature has refined the definition of sustainable development—from very weak to very strong—depending on the importance given to such notions as reversibility and substitutability between physical and natural capital (Collins 1999; Howarth 1997; Hunter 1997; Norton and Toman 1997; Page 1997). Unfortunately, the interpretation of such concepts varies, depending on the disciplinary approach being adopted. For instance, economists and ecologists assign different meanings to the notions of substitutability and reversibility. For economists, substitutability refers to the possibility of maintaining a desired level of production using different combinations of inputs, while reversibility indicates the extent to which a given resource becomes scarce as a consequence of human actions. For ecologists, these two factors determine such ecosystems' physical properties as, for instance, resilience. In this sense, a more resilient ecosystem is one that is more likely to revert to its original condition after a perturbation and/or to find other substitutes in the event that one of the ecosystem attributes is diminished.

Applying the notion of weak sustainability is possible if it is assumed that natural and physical capital are substitutable, or when changes to the natural asset base are reversible. This implies that under the weak sustainability paradigm, intragenerational equity is obtained through the distribution of the efficiency gains arising from the implementation of development projects, while future generations are compensated for the loss of natural assets by inheriting a greater stock of physical capital. However, even advocates of weak sustainability acknowledge that under certain circumstances (such as when physical capital is a poor substitute for the natural resource), efficiency considerations ought not to occupy a central role. For instance, it has been argued

that one generation might set aside special places and features such as the Grand Canyon or the Reef Barrier for future generations because of their intrinsic qualities.

The uncertainty surrounding both the effects of human intervention on the environment and the likelihood of finding feasible technological solutions to environmental problems provides an important argument for strong sustainability. By this it is meant that the opportunities of future generations can be secured only if natural resources and environmental quality are specifically conserved for their benefit. Thus, within the strong sustainability paradigm, conservation concerns are paramount.

Combining Conservation and Efficiency

The foregoing discussion has illustrated that intragenerational/efficiency and intergenerational equity goals are less likely to be in conflict when considered from within a weak sustainability perspective, while supporters of strong sustainability are inclined to reject any trade-off between conservation and efficiency. In line with the latter view, it has become abundantly clear that tourism cannot continue to be the killer of the "goose laying golden eggs" (Hunter and Green 1995: 42). However, it has been argued that strong sustainability, with its emphasis on intergenerational fairness, can conflict with the efficient use of resources that may engender beneficial effects for both present and future (Hunter 1997). That is, the strong sustainability approach is often associated with an anti-economic growth position that appears to deny the world's poor the opportunity of meeting basic needs, both in the short and the long run. Therefore, this article takes the center ground stance indicated in Hunter (1997) by arguing that the essential role of ecological conservation in the implementation of sustainable tourism strategies should, depending on the circumstances, be complemented by efficiency considerations. This is in line with many methodological contributions aimed at bringing together efficiency and intergenerational equity.

The combination of a *conservation* with an *efficiency criterion* constitutes the central element of the *two-tier* method advocated by Page (1977). Using this approach, problems are categorized as being intragenerational or intergenerational in their effects, in the sense specified above. That is, when the latter issues figure prominently, more attention is given to conservation, with possible applications of the "safe minimum standard of conservation principle", which places the burden of proof on today's resource allocators to demonstrate that their behavior is consistent with intergenerational fairness (Howarth 1997). In practice, this approach recognizes the fundamental right of future generations to inherit an intact stock of natural resources, unless the costs of foregoing the resource exploitation (that is, the loss of the efficiency gains from development) are unbearably high (Toman 1994).

Page provides a list of inter-related issues that need to be addressed to achieve a satisfactory combination of efficiency and equity. First,

instruments need to be identified. He suggests that "shifting the tax base toward virgin material taxes and taxes on environmental harms would work toward sustainability" (1997:593). Second, intergenerational equity should always come first when the resource is essential. He cites the US Drinking Water Regulation as an example of public intervention based on equity grounds, as future generations are entitled to a safe supply of drinking water. The example that comes to mind in the case of tourism is the establishment of parks or natural reserves, where regulatory measures are taken toward environmental protection so that the functional integrity of essential, and possibly unique, natural ecosystems is preserved as far as is possible, for the benefit of future generations. Indeed, once a law attributes the status of park or of natural reserve to a given geographical area, heavy restrictions are imposed on the possibility of developing the area, that curtail or impede tourist activity. More importantly, to guarantee that the resource base remains intact, and can be bequeathed to future generations, the status of park cannot be abolished and remains associated with the area indefinitely.

Third, and related to the latter point, the role of the legal framework in which the decision-makers operate is crucial. Practically, this entails that the environmental decisions associated with important equity and efficiency considerations should be dealt with in a manner similar to that used to preserve a system of constitutional law. This is because the "framers of a constitution are expected to abstract themselves from their own narrow self-interest and establish the rules of the game that are sustainable indefinitely" (1997:590). It is essential for modern societal institutions to maintain the constitutional system: to protect it from myopic opportunism triggered by short-term benefits, it is commonplace to have special procedures to modify constitutional dictates. By the same token, environmental problems with important intergenerational equity aspects should be dealt with like constitutional issues whereby the future generations' entitlement to an intact resource base has paramount importance.

Three points that are central in this study may be inferred from the previous discussion: the importance of natural resources, the identification of appropriate policy instruments, and the legislative framework. This article aims to clarify some of the relationships among these issues. At the same time it develops a conceptual framework encompassing all the basic elements that are taken into account in the public assessment of new tourism projects. To this purpose, a theoretical economic model of land taxation is illustrated. Its results show the crucial role played by a tax on land use for the joint achievement of conservation and economic efficiency goals. In addition, its cost-benefit approach clearly indicates that in environmentally sensitive areas—where the resource is essential—the tax should be set at a level that deters development. This result is thus equivalent to the creation of a park or a reserve that remains as close to its original form as possible.

The importance of the legislative framework is investigated using the case study of the so-called "masterplan" in North Sardinia (Italy). The evidence presented, together with considerations from the theoretical

model, are used to shed light on the Sardinian government's refusal to grant a developer special exemptions from existing territorial planning legislation. Indeed, the Sardinian government decided to forego the short-term benefits of a large tourism project because the development allowed the possibility of construction within 300 meters of the coastline, a practice that is prohibited by Sardinian law (article 10bis of law n.45 issued in 1989). The local government recognized that the defense of the conservation principle embodied in the regional law could not be a matter of bargaining, even though this would have entailed, as it actually did, the withdrawal of the project by the developer. Regardless of the merit of the specific project and the good reputation of the developer for quality tourism, the Sardinian government's stance on the project aimed to ensure that other developments might not be created unless sustainable principles were applied (Collins 1999).

SUSTAINABILITY AND PUBLIC INTERVENTION

There is no formal economic model explicitly linking tourism and sustainable development. However, there exists a growing literature aimed at integrating sustainability and formal economic analysis. Faucheux, Pearce and Proops (1996) classified the existing analytical approaches to sustainability using four categories of models: neoclassical, evolutionary, ecological economic, and neo-ricardian. The model presented in this article falls within the first category but departs from existing models by adopting a game theoretic approach where different incentives faced by public and private institutions are taken into account. A technical presentation of the model appears elsewhere (Piga 1999, 2003). The emphasis here will be the description of the assumptions used in this model, and the policy recommendations that can be drawn. This is amplified with a case study that complements and supports the theoretical analysis.

Sustainability and Taxation

The model under analysis is dynamic: it considers a sequence of time periods and how decisions taken in early periods influence the outcomes of subsequent periods. A dynamic approach allows a better identification of the project's long-term effects, notably on land, which is the natural resource under study. This is particularly relevant for tourism. For territorial planning, environmental design, and land use are crucial factors that create and sustain a tourism resort competitive advantage (Gunn 1994). At the same time, tourists increasingly expect a picturesque landscape to be integral to the holiday experience. Moreover, land development is associated with various forms of environmental costs. Both these aspects are captured in the following analysis.

The first economic agent taken into account is a private tourism developer who owns a territory of size $\bar{L}$. For instance, $\bar{L}$ could represent the size of an island. The developer chooses the rate of land exploitation, that is, the portion of the site on which tourism facilities

will be erected. Denoting with $B(t)$ the stock of developed land at time t and with $\sigma(t)$ the size of territory on which the developer decides to build in period t, it is postulated that these two variables are linked by this simple law of variation over time: $dB(t)/dt = \sigma(t)$. Such an expression indicates that in every period t a portion of land $\sigma(t)$ is used to build accommodations. Thus, what is built this year is added to what was developed in previous years, thereby increasing the stock of buildings that constitute the site's capacity. The following example clarifies the meaning of the previous equation. Assume that at time t_0 no land is developed, that is, $B(t_0) = 0$. Then, after a given period of time (such as ten years): $B(t_0 + 10) = \Sigma_{t=t_0+1}^{t=t_0+10}\sigma(t) = \sigma(1) + \sigma(2) + \ldots + \sigma(10)$. Obviously, the size of the development at time t, denoted by $B(t)$, cannot exceed the total size of the territory, namely $B(t) < \bar{L}$. The value of $\sigma(t)$ may also differ from period to period. Another implication is that the transformation of land is irreversible: the site cannot be restored to its original condition.

The discussion so far highlights the well known impact of tourism on environmental quality: "In reality, it is impossible to imagine any kind of tourism activity being developed and then operating without in some way reducing the quantity and/or quality of natural resources somewhere" (Hunter 1997:858). In this particular case, for tourism activity to take place, it is impossible to maintain the resource base intact (not to exploit land). It follows that a satisfactory combination of efficiency and conservation hinges around the identification of both the private and public benefits engendered by the development, of its environmental costs, and of the appropriate policy instruments that induce an optimal level of use of the natural resource.

The first type of private benefit taken into account is the revenue derived from selling to tourists. This depends on the price of the holiday and on the site's capacity, $B(t)$. In turn, it is assumed that the tourists' willingness to pay for a holiday (which represents the highest price they would pay) is positively influenced by the environmental quality of the site, which is measured by the amount of land that is left unused, namely $\bar{L}-B(t)$ (Keane 1997). For simplicity, assume that the relationship between the site's environmental quality and willingness to pay, denoted by $p(t)$, is linear: $p(t) = a+\bar{L}-B(t)$, where the parameter *"a"* indicates the consumers' willingness to pay for all the other features, in addition to environmental quality, characterizing the holiday (gastronomy, entertainment, etc). More importantly, the previous analytical expression indicates that the more the place is developed (the greater $B(t)$ relative to $\bar{L}$), the lower the price the developer can charge for a holiday. Therefore, the developer, when deciding to expand (increase the size of $B(t)$ through the choice of $\sigma(t)$), has to take into account that the revenue increase, due to the possibility of accommodating more tourists, may be more than offset by the reduction in price that is triggered by the deterioration in the environmental quality. Such a novel representation of the links between tourists' demand and environmental quality captures a peculiar feature of the tourism industry that is supported by empirical evidence. Font (2000) presents evidence supporting the notion that environmental

considerations are important drivers of tourism demand. Huybers and Bennett (2000) reach a similar conclusion in an analysis of changes in environmental quality and other features that affect demand.

The local government is the second economic agent taken into consideration. The instrument used to achieve sustainability is a tax on each unit of newly built territory. In each period *t*, the total tax take is given by $T(t) = \psi(t)\sigma(t)$, where $\psi(t)$ denotes the land tax set by the local government. This clarifies the crucial role of the public sector: the tax is a cost to the developer and can be used by the government to appropriate some of the profits generated by the project. As discussed below, the tax guarantees the achievement of intragenerational equity objectives, as the tax revenues in each year can be deployed to ameliorate the local public infrastructure which is then inherited by future generations.

In line with the real-world situation where the legislative framework and the taxing policy is often a given for the developers, the economic model assumes that the local government has a *first-mover advantage* (that is, the government sets the tax level before the developer decides the expansion size). In the economic literature, the player that moves first is defined as a "Stackelberg leader" (Sinclair and Stabler 1997:115–119). In each period, the local government obtains tax receipts given by the tax multiplied by the size of the expanded capacity.

The second part of the government's objective function consists of the net value derivable from the use of the land. Such a value is the net outcome of the government's evaluation of the public benefits from development against its environmental costs. On the one hand, public benefits are generated by tourism activities through a multiplier effect on the local economy arising because a local workforce is used in construction, in operating the tourism facilities and because tourists consume local products (Wunder 2000). On the other hand, land use engenders environmental costs for the local population both in terms of congestion and exhaustion of the natural resource and in the form of loss of non-market benefits such as bequest, option and existence values (Pearce et al 1989). The bequest value is the willingness to pay to preserve the environment for the benefit of future generations. The option value identifies an expression of preference for the preservation of an environment against some probability that a community will make use of it at a later date. The existence value is represented by the utility that individuals enjoy when the risk to an endangered species has been reduced. Development implies the loss of all these values for the local population, the sum of which constitutes the non-market environmental costs. These are particularly high in areas where the ecosystem is less resilient (less likely to fully recover from exogenous shocks) and where, therefore, development may engender irreversible degradation to the environment (Barbier and Markandya 1990). Finally, land use engenders another form of environmental costs to the local population (the lack of access to natural resources, such as beaches) due to congestion arising from having an intensively developed destination occupied by tourists.

The foregoing analysis of the local government's pay-off function

has highlighted that the development engenders benefits in the form of private profits and public income multiplier effects, and environmental costs whose size depends on the characteristics of the area's ecosystem. The difference between these benefits and costs gives rise to a net value function, $W(B(t))$, that depends on the size of the project. A realistic analytical expression for the net value function $W(B(t))$ is one that allows, at an early stage of development, growth benefits, and the related efficiency gains, to be greater than environmental costs, which become predominant as the project increases in size. A quadratic function such as $W(t) = B(t) - \gamma B^2(t)$, exhibits this property: the minus sign attached to the quadratic value of the total establishment's size, denoted by $B(t)$, implies that the environmental costs associated with development, increase at a faster rate than growth benefits, captured by the linear part of $B(t)$. Furthermore, this effect is reinforced depending on the value of γ, that is, the larger γ, the larger the environmental costs relative to the growth benefits. However, when γ is sufficiently large (such as when the loss of existence, option and bequest values is conspicuous) $W(t)$ may be negative even for small levels of tourism activity.

The sum of the tax receipts and the net value function give the total pay-off for the local government: $E(t) = \psi(t)\sigma(t) + W(t) = \psi(t)\sigma(t) + B(t) - \gamma B^2(t)$. Such an expression represents the total value that the local government attaches to the development. This is made up of the pecuniary tax take and of the external effects of the project, namely the growth benefits and the environmental costs. When γ is large enough, environmental costs exceed the monetary value of tax receipts and income multiplier effects even for small values of $B(t)$ that correspond to an early stage of development. In this case, given that $E(t) < 0$, the local government should not allow any activity in the territory. However, in more general cases, the tax receipts may be used to improve the site's infrastructures (schools, hospitals, roads, etc.) whose creation thus compensates future generations for inheriting a smaller stock of natural resource.

This discussion highlights the different objectives pursued by the developer and the local government, because the taxation policy creates a benefit for the latter and a cost for the former. However, without the tax, the external (that is, income multiplier and non-market environmental) effects that the tourism project engenders do not affect the developer's pay-off. Thus, the tax constitutes an instrument that induces the internalization of these external effects in the developer's decision concerning the amount of land to develop. Moreover, it was previously noted that the local government can use taxation to appropriate some of the private profits. This guarantees the participation of the local population in the sharing of the tourism development's benefits and, hence, intragenerational equity. It has also been argued that developments are unable to transfer an intact stock of natural resources to future generations. It follows that the analysis of intergenerational equity, and the related issues of conservation and efficiency, should be carried out by studying how the land tax

presented above should be set depending on the environmental characteristics of the territory.

Results

The following results are derived assuming that both the developer and the government choose, respectively, the size of newly developed land ($\sigma(t)$) and the land tax ($\psi(t)$) in each period so as to maximize the discounted flow of profits over an infinite time horizon. The optimal tax is such that the local government's inter-temporal pay-off $E(t)$ is maximized. The technical analysis used to derive the solution to this maximization problem is beyond the scope of this article. The interested reader is referred to Piga (1999, 2003).

To analyze how the tax affects the equilibrium value of land use, it is customary to derive the socially optimal result and use it as a benchmark against which the model's results are compared. The best outcome, from a social viewpoint, is one in which both parties mutually agree on the size of the territory that is developed in every period. Such a decision entails that all types of benefits and costs identified above are taken into account. Hence, there is no need for the tax, as both parties understand the impact of tourism activity on the area, to the extent that no establishment is built if the environmental costs are greater than the private and public benefits. If development is undertaken, then a lump-sum transfer from the developer to the local government is sufficient to obtain intragenerational equity. Such a benchmark case can be denoted as the "cooperative case", to emphasize the fact that the parties behave as a single entity: this implies that all the external effects associated with the project are internalized and properly accounted for in the decision regarding the project's size. In the remainder of the paper, the equilibrium level of land use in the perfectly cooperative scenario is denoted as $B^*(t)$. Such a case is equivalent to the partnerships model advocated in Middleton (1998:128–9), where a collaborative process is established between the private and the public institutions for dealing with tourism planning and management for a destination.

However, it is very unlikely that the developer and the government have perfectly aligned objectives. While the cooperative case can be used as a benchmark, in a more realistic case the government and the developer behave non-cooperatively as two distinct entities pursuing conflicting goals. Indeed, it is reasonable to expect that the developer wants to maximize the project's private benefits without considering the social costs that it entails, while the government may be particularly concerned with its social costs and the loss of environmental values. From a strategic viewpoint, the government can exploit its "*first-mover advantage*" by imposing a development tax, $\psi(t)$, in order to induce the optimal level of land use which is equivalent to that in the cooperative case. Indeed, if the developer were left free to operate without any form of public intervention, the establishment size would exceed that in the cooperative case, as the environmental costs would not be taken into account. However, even in the non-cooperative scenario,

obtaining the socially optimal level of land use is possible when the government behaves like a Stackelberg leader.

Another advantage of the non-cooperative scenario is that it allows analyzing the effects that different weights used by the parties to discount future benefits and costs have on the resource use. Such weights are represented by the discount factors that capture the extent to which different individuals presently value a gain or a loss that will occur in the future. Those who prefer to make a lower gain today rather than a higher gain tomorrow have a greater discount factor. The length of the planning horizon over which investments are evaluated also influences the discount factor. Traditionally, private developers are more concerned about the short-term implications of their strategies, and thus discount the future more heavily. When evaluating the impacts of human activity on the environment, governments are, at least in theory, more likely to consider the related long-term costs. Hence, more concern by the government for the intergenerational effects of tourism activity are represented by a lower discount rate. The results from the theoretical model reported below are obtained assuming that the developer's discount rate, denoted by ρ_D, is greater than the government's rate, denoted by ρ_G. However, the results are reversed if the local government discounts the future more than the developer, a situation that is more likely to occur in a certain phase of the political cycle, namely before an election.

Having defined the model's components, the qualitative features characterizing the model's solution follow. First, a result common to the cooperative and the non-cooperative setting is that the largest portion of space is developed at the beginning of the development. The rationale behind such a choice is clear: it is optimal to build as much capacity as possible at the beginning of a project because an extra unit of capacity generates revenues forever. Thereby, the developer can more quickly recoup the large initial capital investment used to finance the high start-up costs associated with the project.

Second, and more importantly, the total amount of used land in the non-cooperative case, denoted as $B^{nc}(t,\rho_D,\rho_G)$, is the same as in the cooperative case, $B^*(t)$, when the two parties have the same discount factor: that is, $B^{nc}(t,\rho_D,\rho_G) = B^*(t)$ when $\rho_D = \rho_G$. It would seem that the two settings generate the same outcome with regard to the conservation issue. However, in the non-cooperative setting the two institutions usually value future benefits and costs differently. This has profound bearings on the establishment size in equilibrium. Indeed, as assumed before, if the private developer is less patient, then the model clearly shows that in the non-cooperative case less land will be used in total relative to the benchmark. This corresponds to an equilibrium where $B^{nc}(t,\rho_D, \rho_G) < B^*(t)$ when $\rho_D > \rho_G$. The rationale of such a result is intuitive. A government that places a great weight on the environmental costs that future generations will incur, can set the land tax high enough to deter development beyond $B^{nc}(t,\rho_D, \rho_G)$. It is noteworthy that intergenerational concerns may not conflict with efficiency considerations, because a territory of size $B^{nc}(t,\rho_D, \rho_G)$ is actually developed.

Third, it can be shown that the rate of exploitation of the natural resource occurs at a slower pace in the non-cooperative case, meaning less land (a smaller $\sigma(t)$) is used in every period. It follows that less environmental costs are also incurred. The results that in the non-cooperative case less land is used in total and that the development occurs at a slower pace, cast some doubts on the recommendation that the private and the public sector should seek more collaborative forms of organization of the tourism activity. While it can be argued that the same outcome could be achieved without the tax by having the government setting the limits of development ($B^{nc}(t,\rho_D,\rho_G)$ and $\sigma(t)$ in every t), and the developer agreeing to comply with these limits, such a *command-and-control* arrangement presents, relative to the market instrument of taxation, at least two drawbacks: it carries high bureaucratic costs for monitoring and enforcement, and, most importantly, it may be easier for the parties to renegotiate the terms of the initial agreement because of changes in socioeconomic and/or political conditions, while changes in the tax legislation have to undergo a lengthy parliamentary scrutiny. Thus, a better outcome is obtained when the local government regulates the activity of the private developer by imposing a land tax, relative to a situation where a mutual agreement between the parties is created.

Fourth, the model indicates how public policy adjusts according to the relative size of environmental costs and public benefits in the cost-benefit analysis. Foremost, regardless of whether the environmental costs are greater than the benefits from development or not, it is always optimal for the local government to impose a positive tax on the use of the natural resource at the outset of planning. Obviously, the tax remains positive whenever the environmental costs are greater than the public benefits due to endogenous growth and income multiplier effects. However, when the public benefits are larger than the environmental costs for any establishment size, the optimal tax's time profile exhibits an interesting behavior: at the outset of planning, the tax is positive but at some point in time it is turned into a subsidy, which corresponds to a negative tax. Traditional economic literature suggests the use of a subsidy to attract investments that determine beneficial effects for the host community, including jobs creation, higher local firms' birth rate, and more (Sinclair and Stabler 1997:200–210). An important difference in the present case is that it is optimal for the policymaker to introduce the subsidy only after an appropriate time period, and not at the outset. The rationale can be found in the ability of the tax to extract some of private benefits engendered by the project which otherwise would be totally appropriated by the firm.

Finally, the analysis implicitly allows geographic areas to be taxed differently depending on the sensitiveness of the natural environment. Low environmental costs are associated with non-sensitive areas. The government initially imposes a low tax for development in such areas, which may then become a subsidy if public benefits are greater than environmental negative effects. On the other hand, when concerns for the resilience of the natural environment exist, the tax is set at such a high level that no project is economically profitable for the devel-

oper. This is tantamount to one of the four sustainable tourism approaches proposed by Hunter, that of "Neotenous Tourism", which corresponds to a "very strong sustainability approach … predicated upon the belief that there are circumstances in which tourism should be actively and continuously discouraged on ecological grounds". Furthermore, Hunter argues that in "some places, including national reserves of national or international importance, tourism growth should be sacrificed for the greater good" (1997:852–863). Such a recommendation is equivalent to the case of no development due to the high tax that arises as an equilibrium outcome in the model.

To summarize, the results from the economic model of taxation show that it is possible to pursue conservation objectives without hindering the implementation of viable economic projects that impact the environment. The results crucially hinge on the assumption that the government has a concern for conservation, which in practice is identified by its willingness to give proper weight to environmental damages that may occur in the distant future. As argued at the outset of this paper, such willingness can be expressed by the creation of a legislation that has constitutional value. The following case study illustrates the crucial role that regional planning legislation plays for the establishment of a government's stance towards conservation.

The Case of Costa Smeralda in Sardinia

The previous analysis is based on the properties of a normative model that encompasses a set of economic issues. A test of its predictions is a case study involving a local government and a tourist developer. The evidence presented suggests that the recommendations derivable from the model's results provide a set of principles that local governments apply—or should begin to apply—in their evaluation of tourist projects.

In 1997 a multinational company, *Ciga Immobiliare*, prepared a development scheme for a part of Costa Smeralda on the Northeast coast of Sardinia in the Mediterranean Sea. The project was literally called "masterplan" in the Sardinian and national press, and this is how it will be referred to in the remainder of this article. The following figures are taken from the executive summary released by the developer when the project was presented to the press. The entire project was to cover an area of 24 km^2, 85% located in the territory of the Arzachena municipality and the remaining 15% in the Olbia municipality territory. The total volume of the 11 hotels, 2,000 villas, and 1,900 apartments included in the project was estimated to be 2,550,000 m^3 (14% in hotels, 9% in ancillary services, and 77% in residential dwellings). The planned capacity of hotels and residential dwellings was, respectively, 4,000 and 16,000 beds. The cost of the total investment was calculated to be $1.45 billion and the related increase in local income to be $2.4 billion, with an investment multiplier of 1.7. Although the project was to cover a time span of 25 years, most construction would be completed within the first 5–10 years.

The yearly demand, measured in bednights, was evaluated at 504,000

units in hotels and 960,000 units in residential dwellings, the total being almost three times higher than the average of 560,000 units recorded during the 90s in the already existing hotels owned by the developer in Costa Smeralda. The expenditure by tourists in hotel accommodation and dwellings was expected to total, respectively, $151 and $240 millions and generate an increase in local production of around $500 millions. Further, the developer's study estimated the overall increment in employment in Sardinia to be 12,200 jobs: 4,800 new jobs in hotels and restaurants, 2,000 in trade and retailing, 4,200 in the services, and 1,200 in manufacturing.

Given these figures, the project should certainly have appeared enticing to a local government operating in a region characterized by an extremely high unemployment rate and a much lower per capita income than the Italian average. How was it, then, that the parties did not find a satisfactory agreement and eventually the developer withdrew the project? An answer can be found by analyzing the political stance of the Sardinian government with respect to the magnitude of the social and environmental costs associated with the project.

The Sardinian government had made it clear that the "safeguard of the environmental quality is a factor for economic development" (Sardinian Regional Government 1997:7). Moreover, as far as the masterplan was concerned, the position of the Sardinian government was that "a better balance between the use of the territory, the socioeconomic effects and the developer's profit has to be found". The Sardinian government seemed inclined to grant the building permission, subject to a few changes in the project, including a significant reduction in the number of residential dwellings, and possibly an increase in the number of hotels; priority to the building of hotels and tourism facilities; and respect for the norm that prohibits the construction of any building within 300 meters of the coastline. The local government expressed concern about the number of "scattered dwellings"—presumably villas—which "consume land and make access to the sea more difficult". The Sardinian government's preference for hotels and the request to increase the number of hotels can be found in the regional government's belief that hotels and related facilities would extend the tourism season well beyond the peak months of July and August. The Sardinian government's remark that villas and apartments use more land than hotels is consistent with the theoretical approach and indicate the government's awareness of the environmental costs associated with the project.

The requirement to significantly reduce the number of residential dwellings is directly linked to the theoretical analysis (Tables 1 and 2). The data in Table 1 include census statistics collected in 1981 and 1991. Rows (1), (2), (3) and (4) indicate that the number of dwellings increased sharply, thereby suggesting that intensive building activity took place during the decade in the municipalities of Olbia and Arzachena. A similar phenomenon occurred also in the remaining part of the North Sardinian Province, which includes many other seaside resorts. A first consideration is the obvious positive correlation between the change in the number of resident population (row 11) and the

Table 1. Census Statistics in North Sardinia

		Arzachena		Olbia		Province	
	Variables	1981	1991	1981	1991	1981	1991
(1)	Occupied dwellings	2349	3155	8295	13811	121186	145114
(2)	Unoccupied dwellings	4690	7379	6954	10528	46789	71024
(3)	Of which: usable for holidays	3004	6394	4187	8190	25302	47119
(4)	Total dwellings (1)+(2)	7039	10534	15249	24339	167975	216138
(5)	Ratio (3)/(1)	1.279	2.027	0.505	0.593	0.209	0.325
(6)	Rooms in occupied dwellings	10182	13987	36736	59994	535798	666602
(7)	Rooms in unoccupied dwellings	15767	26292	20752	33990	156306	231132
(8)	Of which: usable for holidays	10374	23238	12906	25745	87998	151278
(9)	Avg. rooms in occ. dwelling (6)/(1)	4.33	4.43	4.43	4.34	4.42	4.59
(10)	Avg. rooms in holiday dwell. (8)/(3)	3.45	3.63	3.08	3.14	3.48	3.21
(11)	Resident population	7998	9435	30787	41095	433842	454904
(12)	Size of territory (Km^2)	228.59	228.61	388.73	376.10	7519.91	7519.93
(13)	Dwelling density (4)/(12)	30.79	46.08	39.22	64.71	22.33	28.74

Source: ISTAT, Istituto Nazionale di Statistica, *Censimenti della Popolazione, Years 1981 and 1991.*

increase in the number of occupied dwellings. However, more relevant to the present analysis is the drastic increase in the number of holiday dwellings, whose number more than doubled in Arzachena and almost doubled in Olbia.

Row (5) reports the ratio of holiday dwellings over occupied dwellings. It shows that, relative to the rest of the province, the two municipalities are characterized to a great extent by the so-called "second homes" phenomenon (holiday houses left unoccupied for most of the year) (Jaakson 1986). In terms of the theoretical analysis, the extensive use of land associated with this type of accommodation entails high environmental costs, deriving for example, from loss of flora and fauna, beach erosion, and degradation of water quality. Other environmental problems relate to the fact that second homes are used mainly during the period of peak demand. Moreover, self-catering accommodations, such as second homes, do not generate as high multiplier effects as hotels. The masterplan might have exacerbated the overcrowding and congestion. Indeed, the dwelling density for the masterplan—3900/24=162.5 dwellings per Km^2 (3900 is the sum of 2000 villas plus 1900 apartments, 24 Km^2 is the size of the territory, above)—is well above the averages of the territories concerned (row (13) of Table 1). This is indicative of how intensively some parts of the space would have been used by the developer. As many of the masterplan's

Table 2. Comparison of Total Building Activity by Location

	Total Building Activity (Sum 1982–1996)	Arzachena	Olbia	Masterplan[a]
(1)	Volume of new residential buildings (m^3)	788505	834450	1,963,500
(2)	Volume of new non-residential buildings (m^3)	260854	1,113,830	586500
(3)	Total new volume (m^3) ((1)+(2))	1,049,359	1,948,280	2,550,000
(4)	Number of new residential dwellings	2630	2845	3900
(5)	Number of new rooms in new residential dwellings	8787	11332	11700[b]

Source: Istat, Istituto Nazionale di Statistica, Statistiche sull'Attivita' Edilizia, Years 1982–1996.

[a] Source indicated in the main text.

[b] Estimated considering an average of 3 rooms per dwelling.

buildings would have occupied areas characterized by high environmental sensitivity, it can be inferred that the social costs deriving from the loss of the "hidden environmental values" would have been conspicuous.

Table 2 provides a summary of the building activity undertaken in the two territories over the period 1982–1996. The variables in this table are the volumes built for residential and non-residential purposes, the number of new residential dwellings and the related number of rooms. They are reported as the sum over the period 1982–1996. These values are compared in the table with those corresponding to the masterplan's blueprint. Volumes are used in the following analysis for various reasons. In Italy planning regulations dictate the maximum allowable volume of a building erected in a territory of given size. Statistics are collected accordingly. Further, volume is a good indicator of building activity because territorial planning imposes restrictions on the total height of buildings. Therefore, volumes are highly correlated with the size of the territory occupied by buildings.

The volume of residential buildings completed over the period in the two municipalities is less than the amount planned by the masterplan's developer (row 1). The comparison between the figures in Table 2 and the size of the project is made even more striking by the consideration that only 15% of the project was planned in the Olbia municipality. This implies that 85% of the residential volumes intended in the masterplan (totaling 1,668,975 m^3) would have been built in the Arzachena's territory. This exceeds the total volumes built there for residential and non-residential purposes over the period 1982–1996 (row (3)). Moreover, an inspection of rows (4) and (5) reveals that the number of residential dwellings and rooms intended in the masterplan is greater than the number of residential dwellings and rooms actually built in each single municipality over the period 1982–1996.

Therefore, Table 2 provides support for the notion that the total size of the masterplan was at least equivalent to, if not greater than, the overall residential building activity in the two municipalities over the period 1982–1996. Hence, had the project been allowed to progress as originally planned, many future development options in the area would have been foreclosed, thereby engendering further social costs in territories where building activity for tourism has been particularly intensive over the last two decades.

The rationale for the aforementioned condition (respect for the norm that prohibits construction within 300 meters of the coastline) lends support to the choice in the theoretical model of considering the local government as endowed with a first-mover advantage enabling them to pursue long-term conservationist policies. Indeed, the rationale of such a norm is that of clearly declaring the Sardinian government's commitment toward the safeguarding of the coastal environmental quality. The exception granted to the masterplan's developer could easily have become the rule, and led to future greater environmental costs from over-exploitation. When it became clear that the project had to be changed substantially in its residential component and that the local government would not have given any permission to build within 300 meters of the coastline, the developer decided not to exercise the option to buy the territories from the current owner (the American multinational *Starwood*) and abandoned the project.

The analysis of this case study highlights the following points that are consistent with the theoretical predictions from the model discussed in the previous section. One, the concern of a local government for the preservation of environmental quality may lead to no development. Two, the local government's behavior emphasizes the importance of maintaining existing legislation aimed at conservation, thereby giving it the status of constitutional dictate. Three, and more generally, the study shows how the variables considered in the theoretical analysis are normally taken into account in the blueprint of any investment project in the tourism industry.

CONCLUSION

This study argues that a limitation of the strong sustainability approach is the lack of emphasis given to efficiency considerations. It suggests the application of the two-tier approach outlined in Page (1997) as a conceptual framework to tackle the issues of intergenerational equity and economic efficiency simultaneously. Such a two-tier method conceives the importance of the natural resource, the identification of the appropriate instruments and the legislative framework as crucial elements. To provide further support to Page's recommendations for the case of tourism, this study has presented a theoretical economic model of taxation and a case study involving a local government and a private developer.

When economic efficiency considerations are paramount, the theoretical model suggests the use of a land tax at the beginning of the

development followed by the possible introduction of a subsidy at a later stage. The tax guarantees that local communities can extract some of the rents created by tourism activity that otherwise would entirely accrue to the developer. At the other extreme, when the development endangers the existence of an essential resource or ecosystem, the theoretical model suggests the prevention of any form of development. In intermediate cases, the tax on land use combines efficiency and conservation goals, as the tax curtails, but does not prevent, tourism activity. This situation is represented in the case study where emphasis is given to the crucial role of territorial planning legislation for the reduction of negative impacts of tourism. Indeed, in the two municipalities of Arzachena and Olbia the number of holiday homes has grown dramatically over the last two decades, thus suggesting the economic viability of such developments.

At the same time, the norm prohibiting constructions within 300 meters of the coastline has prevented the irreversible damage that building on the coast entails, and has forced developers to locate their sites in less sensitive areas. The fact that the Sardinian government chose not to create a precedent by allowing special treatment for the masterplan's developer, suggests that the norm regulates issues that deserve to be treated within a constitutional framework, in line with Page's recommendations. Unfortunately, the norm above does not have a legal constitutional status, and could thus be changed using the process applicable to any ordinary law. This is indeed the intention of the new Sardinian government elected in the year 2000 (to modify legislation on territorial planning to accommodate the possibility of buildings near the coastline).

Both the model of taxation and the Sardinian case study provide support for the argument in Middleton (1998) that governments do not need to introduce new policy instruments, but rather, they should gear the existing ones towards the achievement of sustainable objectives. Thus, territorial planning, building regulation, provision of infrastructure, fiscal incentives and disincentives, ecological labeling (Mihalic 1996), assessment and management of carrying capacity (Collins 1999), and information and education of tourists (Filho 1996) can all be used effectively and play a central role in a public strategy for sustainable tourism.

However, the view advocated by Middleton (1998) that the public and the private sector should seek more integrated forms of organization in the management of tourism does not necessarily follow. The theoretical analysis of taxation clearly indicates that the best outcome, both in terms of conservation and overall efficiency, is obtained when the public sector takes advantage of its ability to set the rules of the game. The Sardinia masterplan example shows that negotiations with the private sector may turn out to be unbeneficial in the long run, especially if the private developer requests special exemptions from the existing legislation, which is aimed at limiting the environmental impact of tourism projects. Whenever the government and the private developer have conflicting views regarding the development of an environmentally sensitive area, the analysis of the theoretical model,

and the support it has received from the case study, suggest that the government should exploit its first-mover advantage, which is incompatible with Middleton's bargaining approach. As a corollary to the analysis, it is concluded that private-public partnership may be favored whenever intergenerational equity issues are not a crucial concern. A

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