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OPTIMAL COMMODITY TAXES WITH TOURIST DEMAND*

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Abstract

With tourism, the existence of country-specific commodities that have to be bought and consumed locally plays an essential role. The paper is about how optimal taxation rules are modified when the taxable goods include goods demanded by tourists. The main point is that tax rates can be manipulated to shift some of the tax burden from domestic residents onto tourists. There is indeed a reason why an optimum taxation approach is useful for tourism, as the goods are consumed inside the host country, and discrimination is difficult.

The paper combines several scenarios where tourism may be relevant for optimal tax policy. It begins by considering the determinants of tourist demand. Then, the well-known optimal commodity tax rules are modified to include the effect of foreign demand. Tourists are assumed to trade at the same prices as domestic consumers, but to have zero welfare weight. Thus, the government must balance the desire to tax tourists with the deadweight loss suffered by its own residents. The government should raise some taxes, when tourism begins. Tourism-oriented goods with low price elasticities should bear the highest taxes. However, tourism-related pollution cannot be taxed at prohibitive rates or tourist revenue would be lost altogether. Possible extensions are introduced, for example competition among destination countries. Should tourism dependent countries that are geographical neighbours and substitutes have closely linked tax systems? What kind of tax policy is best when the tourist destinations serve as complements to each other?

Keywords: tourism, optimal taxation

JEL Category: H, J

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1. Introduction

Tourism¹ today is not only a vital source of foreign currency, but it is one of the fastest growing industries in many parts of the world. Travel is placed rather high in the consumers' scale of preferences. The tourist explosion cannot be regarded as a passing phenomenon. The growth of incomes, the reduction in working hours and the saturation of other forms of consumer spending will cause the trend to continue.

Government policy can play an important role in tourism. First, the government may encourage tourism by advertising tourist attractions abroad. Second, by adopting an appropriate pricing policy it may ensure that the economy achieves the full benefits from tourism. Tax revenue is likely to be the major source of benefits. It provides a method of extracting rents from tourists for the services of the unpriced natural amenities that they consume.

Despite the positive impacts tourism can present a threat to the environment. Environmental impacts grow in line with increases in the number of tourists. Natural and built environments can be damaged by excessive flows of tourists. Congested museums, polluted beaches and eroded landscapes can be problems in tourism areas. A balance between tourism and the environment should be maintained.

The literature on tourism has had its focal point in modelling tourist demand. The framework of consumer demand theory has been used in econometric studies to examine how demand for tourist services or tourist destination areas will react to changes in the main determinants of demand, such as income levels and relative prices.² Other issues remain scarce. Copeland (1991), however, has examined the effects of an increase in tourism on welfare, output and factor prices in the host country using a general equilibrium international trade model. He shows that in the absence of taxes, foreign ownership and distortions, an increase in foreign visitors will increase welfare only if the price of non-tradeables³ increases. Commodity taxes tend to increase the gains from tourism, while factor mobility and foreign ownership tend to reduce them. Diamond (1969) has written a paper on tourism, dealing with optimal pricing.

This paper investigates the effects of international tourism on optimal commodity taxes. There is indeed a reason why an optimum taxation approach is useful for tourism, as the goods are consumed inside the host country, and discrimination is difficult. The investigation starts by considering tourist demand for goods and the motivation to travel. In the third section the well-known commodity tax rules will be modified to include the effect of foreign demand.⁴ An extended version of the problem is considered, where the number of tourists, previously taken exogenous, is a function of a typical tourist's utility level. In section 4 externalities such as congestion and other costs due to tourism are discussed. The model is amended to allow for an externality associated with the consumption of one of the goods purchased by tourists. In section 5 possible extensions are introduced. Section 6 concludes.

2. Tourist Demand

The fundamental motivation for tourist travel is a need, real or perceived, for a break from routine that can best be achieved by a physical change of place. People travel for pleasure. Tourism is about consuming goods and services which are in some sense unnecessary. They are consumed because they supposedly generate pleasurable experiences which are different from those typically encountered in everyday life.

A basic distinction between tourism and other forms of leisure is the travel component. To be able to satisfy his desire to travel, the tourist must be able to afford both the time and the money. Tourism in turn gives rise to various service demands. It should be noted that almost all the services provided to tourists have to be delivered at the time and place in which they are produced. Tourist products cannot be stored.

Tourism-oriented products include such as accommodation, restaurants, transportation and entertainment. As tourists extend their stay at destination sites, they may increase the use of resident-oriented products, such as hospitals, bookstores, or barber shops. However, their main reason for travelling is to enjoy the background tourism elements: natural, sociocultural and manmade attractions. Some background tourism elements are often free goods, for example sunshine.

Tourist demand for goods is similar to the demand for most other products and services. The basic determinants are prices, disposable incomes, tastes, habits and preferences.

A considerable number of studies of the determinants of tourist demand have been published.⁵ There are wide variations in the values of estimated elasticities. However, most of the significant price elasticities were below one, and demand turned out to be highly responsive to income changes. The high income elasticity of demand for tourist services will classify tourism as a luxury. As incomes increase the proportion spent on necessities lessens, leaving more money available for discretionary spending. This income will be spent on leisure, recreation and travel.⁶

3. Optimal Commodity Taxes and Tourism

Most countries use commodity taxes and subsidies to raise revenues or to meet social objectives. When a country is visited by tourists, the main question that arises in this context is: How tax rates should be manipulated to shift some of the tax burden from domestic residents onto tourists? Unless rebates to visitors are feasible, tourists will trade at the same prices as resident consumers. When the government collects an exogenously determined sum in taxes, the welfare of the inhabitants in the country could be raised by more the greater the part tourists pay of it. But we have to keep in mind that taxes, which are assumed to be the same for all consumers, also affect home welfare.

3.1. The Economy

Let us consider the simplest economy imaginable. Suppose that the consumer side of the economy can be treated as if there were only one consumer. Tourists are regarded as an important trading opportunity for the country, and the aim is to maximize the welfare of domestic consumers only. Price discrimination between tourists and residents is not allowed: both visitors and domestic consumers will face the same prices.

Let us assume that there are $m+1$ commodities in the economy. Labour is denoted commodity 0 and the remaining m commodities are consumer goods. Suppose now that the government wants some resources for its own use, and collects the sum T with commodity taxes. Producer prices are assumed to be given, and labour is chosen as untaxed numeraire. Letting t_i be the tax on commodity i , t_i is defined as the difference between the price paid by the consumer (q_i) and that which is received by the producer (p_i): $t_i = q_i - p_i$.

Since the economy is assumed to behave like a consumer the natural objective of the government is to maximize the welfare of the representative individual:

$$(1) \quad U = U(x_{0h}, x_{1h}, \dots, x_{mh}).$$

This function is assumed to satisfy the usual differentiability and concavity requirements with the following sign assumption for the first-order partial derivatives: $U_i > 0$ ($i = 1, 2, \dots, m$) and $U_0 < 0$.

The representative consumer supplies x_{0h} units of labour and consumes x_{ih} of good i ($i = 1, 2, \dots, m$). He is assumed to maximize U subject to the budget constraint:

$$(2) \quad \sum_{i=0}^m q_i x_{ih} = 0.$$

Let x_{if} be the demand by tourists for commodity i of the economy. Then the fixed revenue constraint of the public sector can be written as :

$$(3) \quad \sum_{i=1}^m t_i (x_{ih} + x_{if}) = T.$$

We have agreed that the basic determinants of tourist demand are prices and different attractions such as climate. Thus, if we can assume that those domestic amenities do not change, we can write tourist demand as depending on prices only.

3.2. Optimal Tax Structure

The government aims to maximize individual welfare subject to the revenue constraint (3) and the individual conditions for utility maximization.⁷ Following Diamond-Mirrlees (1971), the problem may conveniently be treated in terms of the indirect utility function.

Forming the Lagrangean

$$(4) \quad L = U(x_{oh}, x_{1h}, \dots, x_{mh}) + \lambda \left[\sum_{i=1}^m t_i (x_{ih} + x_{if}) - T \right]$$

gives the first order conditions for the tax rate t_k :

$$(5) \quad \sum_{i=0}^m \frac{\partial U}{\partial x_{ih}} \cdot \frac{\partial x_{ih}}{\partial q_k} + \lambda \left[\sum_{i=1}^m t_i \left(\frac{\partial x_{ih}}{\partial q_k} + \frac{\partial x_{if}}{\partial q_k} \right) + x_{kh} + x_{kf} \right] = 0$$

$$(k = 1, 2, \dots, m).$$

Writing α for the marginal utility of income to the consumer, the consumer's utility maximization implies that $\frac{\partial U}{\partial x_{ih}} = \alpha q_i$. Further, from the budget constraint of the

consumer we get:

$$\sum_{i=0}^m q_i \cdot \frac{\partial x_{ih}}{\partial q_k} + x_{kh} = 0. \text{ Thus, the condition (5) can be written as}$$

$$(6) \quad \alpha x_{kh} = \lambda \left[\sum_{i=1}^m t_i \left(\frac{\partial x_{ih}}{\partial q_k} + \frac{x_{if}}{\partial q_k} \right) + x_{kh} + x_{kf} \right]$$

$$(k = 1, 2, \dots, m),$$

where $-\alpha x_{kh}$ is the direct impact on social welfare from having a higher consumer price. The expression in the brackets tells us how the tax revenue changes when the tax of commodity k is raised.⁸ The equation states that **the impact of a tax**

increase on social welfare is proportional to the induced change in tax revenue (at fixed producer prices).⁹ In general it is not possible to solve explicitly for the optimal taxes, since the quantities demanded depend on the taxes.

Let us now denote the aggregate consumption of commodity k by X_k , so that $X_k = x_{kh} + x_{kf}$. Then it is possible to rewrite (6) in the form

$$(7) \quad \frac{\alpha}{\lambda} = \frac{\partial(\sum t_i X_i)}{\partial t_k} \quad (k = 1, 2, \dots, m).$$

The formula states that **for all commodities the ratio of marginal tax revenue from an increase in the tax on that commodity to the quantity of that commodity consumed by the domestic consumer is constant.** Thus if we adopt **a tax-reform perspective** it is directly obvious that if

$$-\frac{\frac{\partial \text{Revenue}}{\partial t_i}}{\frac{\partial \text{Welfare}}{\partial t_i}} > -\frac{\frac{\partial \text{Revenue}}{\partial t_j}}{\frac{\partial \text{Welfare}}{\partial t_j}},$$

t_i should rise relative to t_j (at constant revenue). If the reverse holds, then t_i should fall relative to t_j (at constant revenue).

To obtain detailed results on the optimal tax structure, we need to make more specific assumptions. There are some special cases that can give some intuitive insight.

First, let us consider the special case that all cross derivatives of the demand functions vanish as between the taxed goods.¹⁰ Condition (6) may then be rewritten as

$$(8) \quad \phi_k = \frac{t_k}{q_k} = \frac{1 - \frac{\alpha}{\lambda} \cdot \frac{x_{kh}}{X_k}}{E_{kk}}, \quad \text{where } E_{kk} = -\frac{\partial X_k}{\partial q_k} \cdot \frac{q_k}{X_k}$$

$$(k = 1, 2, \dots, m).$$

The idea behind this rule is to impose **the highest tax rates on the commodities with the lowest price elasticities** of aggregate demand. But **the higher the share of domestic consumption of good k is the lower the tax rate on that commodity should be**. Thus, if we have good j purchased only by domestic consumers, condition (8) is simplified to **the well-known inverse elasticity rule**¹¹

$$\phi_j = \frac{1 - \frac{\alpha}{\lambda}}{\varepsilon_{jjh}},$$

where $-\varepsilon_{jjh}$ is the direct price elasticity of demand for the good. Recall that the factor α/λ is positive, and can be interpreted as the marginal rate of substitution between private and public income. So, **if the marginal value of private income a is higher than that of public income, commodity j should be subsidized. In the case of $a=1$ the optimal solution is the zero tax rate on good j** . If, instead, the commodity l is produced only for tourists, we should have

$$\phi_l = \frac{1}{\varepsilon_{llf}},$$

where $-\varepsilon_{llf}$ is the price elasticity of tourist demand for the good. For such a good social welfare U is independent of its price and **the government should set the tax rate to maximize tax revenue from tourists**. - Souvenirs are a good example. They are produced merely for tourists and they are goods whose prices hardly affect other types of demand. In summary, the results indicate that **a simple tax structure (uniform sales or value-added taxes) is very seldom optimal**.¹²

Equations (5) were derived only for $k = 1, 2, \dots, m$. But they hold also for $k = 0$. Thus, it is possible to rewrite (7) as

$$\frac{\alpha}{\lambda} = \frac{\partial \left[\sum_{i=0}^m (q_i - p_i) X_i \right]}{\partial q_k} \cdot \frac{1}{x_{kh}} \quad (k = 0, 1, 2, \dots, m).$$

The tourist side of the economy is treated as if there were only one tourist. Further, since the tourist does not work, the tourist expenditure in the country is assumed to be some constant.¹³

Using ordinary demand elasticities,

$$\varepsilon_{ikh} = \frac{\partial x_{ih}}{\partial q_k} \cdot \frac{q_k}{x_{ih}} \quad \text{and} \quad \varepsilon_{ikf} = \frac{\partial x_{if}}{\partial q_k} \cdot \frac{q_k}{x_{if}},$$

we can now rewrite the optimal taxation formula in the form

$$(9) \quad \frac{\alpha}{\lambda} = \frac{1}{q_k x_{kh}} \cdot \left[q_k X_k + \sum_i t_i x_{ih} \varepsilon_{ikh} + \sum_i t_i x_{if} \varepsilon_{ikf} \right].$$

If we have a good whose price does not affect other types of demand, implying a unitary own-price elasticity ($\varepsilon = -1$)¹⁴, equation (9) simplifies to yield the optimal tax on that good:

$$\frac{q_k}{p_k} = \frac{\lambda}{\alpha} \left(1 + \frac{x_{kf}}{x_{kh}} \right) \quad (x_{kh} \neq 0).$$

Thus, the more the consumption of good k is concentrated in the tourist sector, the higher taxes we have to impose on the good. **For goods consumed in the same proportion by tourists and domestic households tax rates become equal.** If tourists do not consume the commodity, the tax rate should be set according to

$$\frac{q_k}{p_k} = \frac{\lambda}{\alpha},$$

which is the well-known optimal tax result found in Diamond-Mirrlees (1971, p. 264). If the good k is consumed only by tourists, so that $x_{kh} \rightarrow 0$, but x_{kf} is > 0 , the rule degenerates to: $\frac{q_k}{p_k} \rightarrow \infty$. The same pricing rule will follow also from $\phi_{lf} = \frac{1}{\varepsilon_{lf}}$ in the above, provided that the elasticity $-\varepsilon_{lf}$ takes the value -1 .¹⁵ For the commodity, the result indicates an extremely high consumer price as compared to the production costs. Either the production costs of that commodity are zero or the production costs p_k are insignificant. The result is equivalent to choosing the price level so that taxes paid by tourists by consuming the good are maximized. - The commodity is free in the sense that the production costs are of minor importance. For one reason or another the inhabitants of the country are not interested in consuming it. However, since tourists demand it and are willing to pay for it, a tax can be collected.¹⁶ An example could be a tourist beach. According to the tax rule an entrance fee (= tax) for tourist beaches should be set.¹⁷

3.3. The Number of Tourists

Tourist expenditure is likely to be of more interest for policy purposes than the number of visits, but fewer econometric studies have looked at this aspect. The most frequently used dependent variable is the total number of visits.¹⁸

A tourist maximizes his utility under budget constraints. The supernumerary income that remains after expenditure necessary to maintain the standard of living at home can be allocated among various products abroad.

Thus far we have considered tourist demand as an aggregate. Let us now allow separately for the number of tourists and the demand of the typical tourist for different commodities. Write the tourist demand for good i to be $x_{if} = N \cdot \tilde{x}_{if}$, where N is the number of visitors and \tilde{x}_{if} the demand for good i . Assume N to be a function of

typical tourist's utility level: $N = N(\tilde{U}_f)$. Both \tilde{U} , and so also N , and \tilde{x}_{if} are functions of the price structure of the country. In fact, we are assuming that prices determine the tourist type as well as the number of them.

The rule (7) can now be written as

$$(10) \quad \frac{\alpha}{\lambda} = \frac{\frac{\partial}{\partial t_k} \left[\sum_i t_i (X_i)_{dN=0} \right] + \frac{\partial N}{\partial t_k} \sum_i t_i \tilde{x}_{if}}{x_{kh}} \quad (k = 1, 2, \dots, m).$$

In expression (10) the marginal tax revenue associated with a marginal increase in the tax rate on the commodity are written in two separate components. The first component contains the effect for a given level of tourist visits while the latter contains the effect via the change in visitor numbers only. If the numbers remain constant, then increased expenditure implies increasing average expenditure per tourist, implying longer-staying and/or higher expenditure tourists. On the other hand, if the numbers increase faster than the increase in expenditure the exact opposite effect could be postulated.

Let us consider goods that are produced only for tourists and especially a good l whose price does not affect other types of demand. Then the optimal tax rule

$\phi_l = \frac{1}{\varepsilon_{l|f}}$ above, where $-\varepsilon_{l|f}$ is the price elasticity of tourist demand of the good, can

be rewritten in the form

$$\phi_l = \frac{t_l}{q_l} = \frac{1}{\left[\varepsilon_{l|f} \right]_{dN=0} - \gamma}.$$

Here the elasticity $-\varepsilon_{l|f}$ is divided into two components: to "the price elasticity of

tourists" $\gamma = \frac{\partial N}{\partial q_l} \frac{q_l}{N}$, and the price elasticity of the good at constant number of visitors

$$\left[-\varepsilon_{l|f} \right]_{dN=0}.$$

In making their travel plans tourists may assess the price of just a certain good or service. Such goods and services are naturally important for domestic policies designed to attract foreign visitors.¹⁹ **Through its pricing policy the country can affect not only the number of tourists' visits, but the quality of visitors as well.** Resorts that are fairly cheap places to visit cater for a mass of middle-class visitors, while wealthier holiday-makers go elsewhere looking for superior accommodation, scenery and social tone. Holiday-making is a form of conspicuous consumption. The attractiveness of a place depends on how many other people are staying there and especially how many other people there are like oneself. Most countries are nowadays opponents of high-volume, large-scale, enclavic forms of tourist development. Mass tourism has been seen to fail to deliver economic benefits while causing severe social disruption. High price level country will attract wealthier tourists if it attracts tourists at all.

3.4. An Example

In order to illustrate our theoretical results let us consider a three good economy with fixed producer prices. Assume that the consumer has Cobb-Douglas preferences:

$$U = a_1 \log x_{1h} + a_2 \log x_{2h} + (1 - a_1 - a_2) \log(A + x_{3h}), \quad x_{1h} \geq 0, \quad x_{2h} \geq 0, \quad -A \leq x_{3h} \leq 0.$$

Take first the case without foreign demand. With good 3 as untaxed numeraire the optimal tax structure to finance government expenditures at size T becomes:

$$\frac{q_i}{p_i} = \frac{\bar{\lambda}}{\alpha} = \bar{\lambda} p_3 A \quad (i = 1, 2),$$

i.e. a uniform tax rate is preferable.²⁰

The proposition above treats all consumer as identical, whereas tourists have a zero welfare weight. It would be counterintuitive if we did not want to raise some taxes when tourism begins.

When tourist demand is introduced the optimal price structure of the economy is the following:

$$\frac{q_k}{p_k} = \frac{\lambda p_3 A}{1 - \frac{\lambda}{a_k} \frac{\partial}{\partial q_k} \left[\sum_i t_i x_{if} \right]} \quad (k = 1, 2).$$

The marginal tax revenue paid by tourists associated with a marginal increase in the tax on the commodity, i.e.

$$\frac{\partial}{\partial q_k} \left[\sum_i t_i x_{if} \right] \quad (k = 1, 2),$$

can be positive, negative or zero. If it happens to be zero, for instance with $k = 1$, the optimal price $q_1 = \lambda p_3 A$ will be lower than the corresponding price ($= \bar{\lambda} p_3 A$) before tourism.²¹ The greater the value of this term is, the higher the tax that can be set on the commodity concerned. This gives the rule **to tax more heavily the commodity with high tax export character**. Raising the price q_k , which means higher taxes, normally makes the demand x_k lower, which lowers the sum of taxes received. But raising q_k may induce tourists to substitute x_k to x_l , which at the same time may produce a higher tax sum.

Note that **uniform taxation** may still be optimal when tourism begins. The rate can, of course, be different. This is true, if

$$\frac{\frac{\partial}{\partial q_1} \left[\sum_i t_i x_{if} \right]}{\frac{\partial}{\partial q_2} \left[\sum_i t_i x_{if} \right]} = \frac{a_1}{a_2}.$$

Now from the FOC's for the consumer's utility maximization we know that

$$\frac{a_1}{a_2} = \frac{q_1 x_{1h}}{q_2 x_{2h}}.$$

Thus, if the change in taxes paid by tourists due to a change in q_1 divided by that due to a change in q_2 is equal to the ratio of the expenditure shares of those goods for resident citizens, uniform taxation is preferable.

Further, the tourist budget may be fixed. In that case the optimal tax rates can be expressed as

$$\frac{q_k}{p_k} = \lambda p_3 A \left[1 + \frac{x_{kf}}{x_{kh}} \right], \quad \text{where } x_{kh} = (a_k A p_3) / q_k \quad (k = 1, 2).$$

A uniform tax rate is now preferable provided that $\frac{q_1 x_{1f}}{q_2 x_{2f}} = \frac{a_1}{a_2}$, i.e. if the expenditure shares of the commodities in the tourist budget equal the expenditure shares of those goods for domestic consumer.²²

4. Optimal Taxation in the Presence of Externalities

Tourism is often based on a country's natural attractions, and the quality of these attractions plays a very important role in tourist demand. Quality in turn depends on the exploitation of the resource. As a consequence, there is a negative relationship between quality and the tourist population. Consider, for example, a natural attraction such as a beach. The higher the number of tourists allowed to stay there, the lower the per-capita availability of the resource is and the lower the quality of the good.

Preferences are such that more of the natural resource is preferred to less. Consumers are adverse to crowding, and human congestion has a significantly negative impact on the users' willingness to pay for those services. However, in the absence of public restrictions most resorts are likely to become overcrowded, since individual tourists may ignore their own contribution to the depletion of the natural

resource. There may come a point when more people use the area than can be supported by it. The result is a spoiling of the environment.

When externalities are present, Pigovian taxes can be used to correct the inefficiencies. But the government may need other, distortionary taxes in order to satisfy its revenue requirements. Sandmo (1975) has shown that the Pigovian principle holds in a modified form in a second-best situation.

Let us now consider the theoretical problem of determining optimal taxes when a negative externality is present and the country is visited by tourists. Let good m be the externality creating good. The externality is assumed to be a function of the total consumption of that good. Now the utility function of the representative consumer can be written as

$$(11) \quad u = u(x_{0h}, x_{1h}, \dots, x_{mh}, x_{m+1}),$$

where $x_{m+1} = x_{mh} + x_{mf}$ ($= X_m$) with $u_{m+1} < 0$ represents the effect of the atmospheric externality.²³

The individual is assumed not to take account of his own contribution to congestion, so that the first order condition corresponding (6) is

$$(12) \quad \alpha x_{kh} = \frac{\partial u}{\partial x_{m+1}} \cdot \frac{\partial (x_{mh} + x_{mf})}{\partial q_k} + \lambda \left[\sum_{i=1}^m t_i \left(\frac{\partial x_{ih}}{\partial q_k} + \frac{\partial x_{if}}{\partial q_k} \right) + x_{kh} + x_{kf} \right]$$

$$(k = 1, 2, \dots, m).$$

The way in which the externality affects the optimal price structure is seen clearly in the special case where there are no cross price effects. In that case condition (12) gives the same conditions as before for goods $1, \dots, m-1$. In contrast, with the good generating the external effect, there is a further term. For example, instead of rule (8) commodity m should now be taxed according to the following rule:

$$(13) \quad \phi_m = \frac{t_m}{q_m} = \frac{1 - \frac{\alpha}{\lambda} \cdot \frac{x_{mh}}{X_m}}{E_{mm}} - \frac{\alpha}{\lambda} \cdot \frac{u_{m+1}}{u_m}, \quad \text{where } E_{mm} = -\frac{\partial X_m}{\partial q_m} \cdot \frac{q_m}{X_m}.$$

When there is no foreign demand, equation (13) reduces to

$$\frac{t_m}{q_m} = \frac{1 - \frac{\alpha}{\lambda}}{\varepsilon_{mmh}} - \frac{\alpha}{\lambda} \cdot \frac{u_{m+1}}{u_m} = \left(1 - \frac{\alpha}{\lambda}\right) \cdot \frac{1}{\varepsilon_{mmh}} + \left(-\frac{\alpha}{\lambda} \cdot \frac{u_{m+1}}{u_m}\right),$$

i.e. **the optimal tax rate for the externality creating good is a weighted average of the inverse elasticity and the marginal social damage.** This is the statement of the result by Sandmo (1975); the statement that holds true also without the assumption of independent demands.

Rule (13) is an extension of Sandmo's result to cover the demand of visiting tourists as well. Here **the optimal tax on the externality-creating commodity is not a weighted average of the two terms, but the additivity property holds: the marginal social damage of commodity m enters the tax formula for that commodity additively.**

Let us consider goods purchased only by tourists. If the commodity does not involve a negative externality, social welfare is independent of its price, and the government should set the tax rate to maximize tax revenue from tourists. However, **if the commodity purchased only by tourists is externality-generating²⁴, marginal social damage should be reflected in the tax on the good. Setting the tax rate to maximize tax revenue from tourists is not optimal** in this case. For such a good

$$\frac{t_m}{q_m} = \frac{1}{\varepsilon_{mmf}} - \frac{u_{m+1}}{q_m \lambda} = \frac{1}{\varepsilon_{mmf}} - \frac{\beta}{\lambda} \cdot \frac{u_{m+1}}{v_m},$$

where $q_m = \frac{v_m}{\beta}$ follows from **the tourist's utility maximization** under the budget constraint; v denoting the tourist's utility function and β the marginal utility of the tourist's budget.

In the Sandmo's case, marginal rate of substitution between private and public income ($= \alpha / \lambda$) equal to 1 implied the first best solution with a tax on good m only. When the foreign demand is present as in our case, the first best would require α / λ to be equal to $X_i / x_{ih} \forall i (i = 1, 2, \dots, m)$, which is a very demanding condition. **However, if the externality-generating commodity is purchased only by tourists, the Pigovian tax alone does never satisfy the tax requirements exactly.** Additional taxes will be called for.

This is the standard "fishing-in-a-lake" story, but things become a bit more complicated depending upon who the "fishers" are (h or f), who they hurt, and whose utility is taken into account for setting taxes. Social damage should be reflected in the tax on the good, but tourism-caused pollution cannot be taxed at prohibitive rates (or simply prohibited, as a taxable good is probably an excludable good, too) or tourist revenue would be lost altogether.

5. Possible Extensions

(1) More structure on the decision problem of tourists. There may be more mileage to be gained by imposing rather more structure on the decision problem of tourists. A tax instrument missing from the analysis can be introduced: the departure tax (or entry fee). The ability to deploy such a tax might perhaps affect the optimal tax rules. For example, one could presumably raise the same revenue from each tourist and make them better off (so attracting more of them) by exempting them from commodity taxes but charging them an equal-yield entry-fee. Furthermore, tourists are effectively constrained to take large amounts of leisure during their visit. Consequently, the presence of tourists presumably strengthens the conventional Ramsey-type presumption that complements with leisure should be taxed especially heavily. Moreover, and perhaps more subtly, since tourists have no earned income in

the country visited, a uniform commodity tax will cease to be equivalent to a wage tax. This suggests that not only the structure of commodity tax rates but also their level will be affected by tourism. One might expect the balance between direct and indirect taxes to be shifted by tourism towards indirect taxation.

(2) *Externalities*. Regarding externalities, there seems to be two potential problems. One is that increased tourist congestion harms domestic consumers, and the other is that excessive tourist use makes the area unattractive to other tourists. We considered the case, where demand depends only on prices. When demand also depends on congestion, the optimal price structure is different. Consumers may even be price insensitive and congestion sensitive in their demands. If the destination is allowed to deteriorate, tourists may well be turned away, for the very thing that attracted them in the first place is no longer attractive. It could be interesting to combine the section on endogenous number of tourists with a congestion externality using the well-known formulation of the consumption benefits of a good (x) as $\hat{x} = x/N^a$, $0 < a < 1$. Thus for $a = 0$, $\hat{x} = x$ (no congestion), while for $a = 1$, $\hat{x} = x/N$ (full congestion).

(3) *Tax Competition*. The tourist sector is entering an age of more competition among destination regions and countries. Moreover, consumers are both more knowledgeable about tourist destinations and travel options, and more demanding regarding the travel and tourist products and services chosen.

The competing countries²⁵ share many common characteristics specific to the group, such as natural and climatic conditions, otherwise they would not be substitutes. They compete for the same tourists as, for example, Greece and Turkey for North European tourists. Differences in the price structures attract tourist demand from one country to the other. Changes in the price of the holiday will be transmitted to the tourist as the reputation for expensiveness or cheapness of the country.

But countries need not be substitutes. They may specialize in alternative types of tourists, or the countries may be complements. For example, from an American perspective visits to Latin America and to Europe attract separate tourist groups,

while visits to Europe by Americans generally include trips to several European countries.²⁶

(4) Expenditure Side. A problem in government policy toward tourism is related to the expenditure side. First, the government may encourage tourism by advertising tourist attractions abroad. Second, in some countries additional money has to be spent in order to protect tourists. Third, an important aspect in a person's decision to visit a country concerns also the infrastructure. A country may have beautiful amenities, but it attracts few tourists if it is not easily accessible from other countries and/or transportation within the country is difficult. Consequently, the government faces various significant tradeoffs.

6. Concluding Remarks

Tourism represents a special category of demand. It is a demand for a bundle of goods and services. Furthermore, tourist goods and services are not transported to their users, but rather the consumers are transported to the goods and services. Tourist demand functions may look quite different than the demands for the same commodities by domestic residents.

Time is a very important factor in tourism. A person determines how much time and money should be allotted to the holiday. Different people in different circumstances look for different ways to spend their holidays. Natural, sociocultural and manmade attractions are the elements that constitute the main reasons for travel. Prices would be expected to be the most important along with special factors of a noneconomic nature which potential tourists would encounter at the tourist destinations.

Tourism is an economic activity that provides the countries receiving tourists with a dependable source of income and foreign currency. The magnitude of the economic benefit depends on price strategies. Tax revenue is likely to be the major source of benefits from tourism. Economists have long recognized that the ability to export taxes to out-of-state taxpayers should affect the choice of tax instruments.

This paper has analysed optimal tax policy in the presence of tourism with a very simple model. Tourists were assumed to trade at the same prices as resident consumers, but to have a zero welfare weight. Taxes assumed to be the same for all consumers also affect home welfare. Thus we cannot charge tax rates that will only maximize tax revenue from tourists. The home country government must balance the desire to tax tourists with the deadweight loss suffered by its own residents.

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Notes

¹ A variety of definitions for **tourism** exist. Mill (1990, p. 17) gives the definition of tourism as: "Tourism is not an industry, although tourism gives rise to a variety of industries. Tourism is an **activity** engaged in by people that travel." Pearce (1981, p. 1) defines tourism as temporary stays of people travelling primarily for leisure or recreational purposes.

² Johnson -Ashworth (1990)

³ Goods and services, such as restaurant meals, that are normally non-tradeable, become partially tradeable when the country is visited by tourists.

⁴ This section is based on Hämäläinen (1982, pp.76-95).

⁵ See Johnson - Ashworth (1990).

⁶ Once consumers have made the choice of how much income will be allocated to travel demand, they have to decide which tourist destination will be visited. Competitive relationships often exist among destinations vying for the same tourist markets. There is evidence that some tourist destinations serve as substitutes, whereas others are complementary. According to Eadington-Redman (1991) destination sites may be classified as luxury, normal or inferior.

⁷ In fact, this can be seen as a special case of the many-household optimal commodity tax problem (Atkinson-Stiglitz 1980, pp. 386-388) when only two households exist and the second has a zero welfare weight in the government's utility function.

⁸ Since $-\lambda$ is negative (as the marginal social value of an increase in T), no account being taken of the uses of T , it follows that λ is > 0 .

⁹ The statement holds true whether there are tourists visiting the country or not. See Diamond-Mirrlees (1971) pp. 261-262.

¹⁰ A more reasonable assumption would be that commodities fall into groups so that goods are more or less independent between the groups, but dependent within the group.

¹¹ Equivalent to rule (13) in Sandmo (1976), p. 45.

¹² This particular model does not consider practical concerns that tend to favour simple systems, things like implementation costs, compliance costs, transparency, etc., which appear to influence actual government policy-making. For instance, in European countries there has been a move towards uniformity of tax rates with the introduction of value added tax. (- At the same time differential rates have been maintained in most countries.)

¹³ This is a natural assumption, since when making their travel plans, tourists have to make the choice how much income will be allocated to the vacation package as a whole. Even though the tourist budget is assumed to be fixed, there still remains the question of how the sum is to be allocated between different goods.

- In reality, currency restrictions are imposed on people travelling abroad and limits are imposed on foreign tourists concerning the importation or exportation of the currency of the country visited. (Applicable only to a fraction of world vacation travel spending.)

¹⁴ Cournot aggregation condition.

¹⁵ This is also the pricing rule of a monopolist operating at zero cost if $\varepsilon = 1$.

¹⁶ Goods produced at zero marginal cost should be free if there is no rivalry (no congestion) in use and if fixed costs can be covered by a lump sum tax. Otherwise they should be charged according to the Boiteux-Ramsey rule (Atkinson-Stiglitz, 1980), provided excludability can be organized.

¹⁷ In general, the entry fees of tourists help governments to maintain scenic and historic heritage; monuments, buildings and parks.

¹⁸ Johnson-Ashworth (1990), pp. 145-6.

¹⁹ The findings of Pyo-Uysal-McLellan (1991) suggest that among the tourist-oriented products, transportation is the most price sensitive product. Expenditures on food consumption away from home cannot be reduced very much. Thus transportation cost reduction can be persuasive and attractive. The income elasticity of transportation turned out to be greater than one, suggesting that transportation is a luxury product, whereas demand for food services was inelastic. Other income elasticities of demand were almost unitary. The uncompensated price elasticities of the study were -0.580 and -0.250 for transportation and food service. Cross price elasticities were very small, except in the transportation equation. - If the price of any good increases, people tend to decrease spending on transportation most. In the uncompensated price elasticity context, the resident-oriented products were more price elastic than the tourism-oriented products suggesting that many higher income tourists would travel even though there were a price increase. All uncompensated cross-price elasticities had negative signs.

²⁰ The Cobb-Douglas preferences implies separability between commodity consumption and leisure. It is well known that uniform taxation is optimal in this case. See, e.g. Myles (1995), pp. 125-7.

²¹ The marginal social value of an increase in T is smaller with tourist demand, i.e. $\bar{\lambda} > \lambda$.

²² C.f. Myles (1995), pp. 112-3.

²³ The treatment of the externality is rather stylized, but it will capture essential aspects of environmental externalities (traffic congestion, air and water pollution resulting from the production of certain commodities, etc.) The externality is technological rather than congestion-based.

²⁴ An example could be the noise of a tourist beach.

²⁵ On tax competition, see Mintz-Tulkens (1986), Crombrughe-Tulkens (1990) and Kanbur-Keen (1993).

²⁶ Syriopoulos-Sinclair (1993) found out that individual countries within the Mediterranean group may be substitutes or complements. According to Syriopoulos-Sinclair (1993) the elasticities of expenditure demonstrated considerable differences in tourist demand preferences between origin countries, and between traditional and newly developing destinations. The own and cross-price elasticities indicated the importance of effective prices. Although tourism plays a major role in the economies of all the destinations considered, the elasticity values indicate that the effects of an increase in tourist expenditure differ notably between destinations. Turkey, followed by Portugal and Greece, appeared to be the most tourist expenditure elastic destinations, while Spain and Italy seemed to benefit only marginally from increases in total tourist expenditure by the origin countries. Tourists' reactions to effective price changes varied considerably, both by origin countries, for a given destination, and by destination, for a given origin. The estimated cross-price elasticities also varied considerably, and indicated a range of substitutability and complementarity among destinations. Tourists originating from Sweden, followed by the UK and Germany, seem to pay considerable attention to effective prices, and real price changes in the destinations considered would have a major impact on tourist flows from these countries. Effective prices were an important determinant of the demand for tourism in the Mediterranean. Whereas the Mediterranean destinations considered might be expected to be substitutes for each other, given the similar tourism characteristics, complementarity would not be unrealistic, as tourists may include more than one destination in their holiday decisions. Spain and Portugal turned out to be substitutes, Greece and Italy complements.