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ON THE ECONOMICS OF TOURISM

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A. Introduction

Tourism is not only an important foreign exchange earner but it is one of the fastest growing industries in East Africa.[1] There are two reasons why international trade theory, a branch of economics explicitly dealing with transactions between the domestic economy and the rest of the world, is inadequate for dealing with tourism. First, government expenditures to encourage tourism which are not directly revenue generating are important in tourism (the most obvious example is advertising). It is true that governments also spend to encourage foreign demand for their commodity exports. But this is less important for most commodities than for tourism and in any event is not, to my knowledge, a developed part of trade theory.

Second, and requiring a more thorough revision, is the difference in the price structure at which transactions take place in the two problems. By means of import duties and export taxes the government is able to construct a totally different domestic price structure than the prices at which foreign trade takes place. For example, in the theory of the scientific tariff the government can take advantage of any monopoly power which it may have in foreign trade without affecting the domestic equality of marginal rates of substitution and transformation. On the other hand, tourists in East Africa and many other places trade with domestic suppliers at the same prices as domestic consumers. There are some exceptions, such as game park entrance fees in Kenya and Tanzania, but the bulk of transactions fit this description. (In some countries there is far more separation of tourists and domestic consumers, with tourist-only shops and hotels, and tourist tax rebates, but these are not, as yet, practical alternatives in East Africa.)

This paper proceeds in several steps to show the implications of the differences between tourism and other international trade transactions described above. After defining tourist demands in Section B, Section C contains a discussion of an economy with a single resident consumer (or equivalently lump-sum redistribution among consumers to maximize social welfare) where tourists face different prices from the domestic consumer and with government expenditures to encourage tourism. We then, in Section D consider the case where the single domestic consumer and the tourists face the same prices, which are all subject to excise taxes should the government so desire. Finally, in Section E, we drop the assumption of single consumer (i.e. we drop the assumption of lum-sum taxes).

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1. See F. Mitchell, "The Costs and Benefits of East African Tourism" EAER., June 1969

B. Tourist Demand

Let w be the vector of net demands by tourists for all commodities in which they make transactions with the domestic economy. We stress that w includes all commodities including the foreign currency which they bring to make purchases (as a good supplied this will appear as a negative net demand). Let q be the vector of prices facing tourists. Then, since w includes all tourist demanded commodities the tourist budget constraint is $qw = 0$, assuming that tourists do not accumulate bad debts or lend without getting return. We shall assume that either directly (as with game park fees) or indirectly (through taxes and tariffs) the government has full control over the set of prices at which tourists transact. This is not strictly true for there are many domestic commodities purchased (e.g. food, hotel services, curios) which are not subject to excise taxes in all three countries. However, it does not seem administratively infeasible to tax (the major value) of these commodities. We, therefore, assume this to be a policy decision and discuss the appropriate levels of the taxes on tourist commodities.

Tourist demand is affected by the level of government services provided in addition to the prices tourists face Let us denote by z the net demand by the government for commodities used to encourage tourist demand. For example, the government demands foreign currencies to pay for advertising abroad of tourist attractions; the government demands labour and capital services to provide adequate tourist handling facilities at the airport and roads in game reserves and so on. We shall assume that these services affect tourists but do not affect domestic consumers.[2]

We have agreed that tourist demand depends on two factors, prices and the quality of government services. Thus we can write demand as $w(q,z)$. Let us note that we assume tourist demand to be homogeneous of degree zero in all prices. Thus we can use foreign currency as numeraire tourists only caring about the cost in their home currencies of tourism and not in nominal prices.

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2. With the exception of advertising abroad, this is an unrealistic assumption since domestic consumers also use airport, game reserves, and almost all services provided for tourists. To extend the model to include these effects would only require the subtraction of domestic benefits from the cost of providing services. This extension is straight forward and is not directly discussed here.

C. <u>Fully Controlled Economy</u>: Lump Sum redistribution; price discrimination against tourist possible.

Let us begin with the unrealistic case where the tourists can be fully isolated from the domestic economy. Thus, we assume that the government has the power to set prices which tourists will face independent of the prices existing in the economy for residents. This case, which parallels the structure of normal foreign trade, is our starting point to bring out the differences inherent in tourism. Let us further assume that there is one domestic consumer or equivalently the government has the power to levy lump sum taxes within the domestic economy and so can achieve any income distribution that is technologically feasible.[3]

Let us denote by x the vector of aggregate net demand by domestic consumers. Let us denote by y the vector of aggregate supply by producers. Let us denote the aggregate production constraint by $F(y) = 0$. Given the full control over prices and income distribution, we can equally well assume that the government directly controls x and y. We can thus set up the problem of welfare maximization in the following familiar form

$$(1) \quad \underset{q,x,y,z}{\text{Maximize}} \quad U(x) \qquad \text{subject to} \quad w(q,z) + x = y - z, \quad F(y) = 0.$$

where the constraints reflect market clearance and production possibilities.

Let us form a Lagrangian expression from this maximization, using the vector λ for multipliers for the market clearance equations and μ as multiplier for the production constraint. Then, we can write the Lagrangian expression as

$$(2) \quad L(q,x,y,z,\lambda,\mu) = U(x) - \lambda(w(q,z) + x - y + z) - \mu F(y).$$

Differentiating the Lagrangian expression with respect to the Lagrange multipliers and equating these expression to zero, we obtain the constraints we have written above, so we need not repeat them. Differentiating with respect to consumer quantities, we obtain the n equations

$$(3) \quad \frac{\partial U}{\partial x_k} - \lambda_k = 0 \qquad k = 1,2,\ldots,n$$

or in vector notation

$$(4) \quad U_x - \lambda = 0.$$

Differentiating with respect to production supplies we obtain the n equations

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3. See P.A. Samuelson, "Social Indifference Curves", Quarterly Journal of Economics, Feb. 1956.

(5) $$\lambda_k - \mu \frac{\partial F}{\partial y_k} = 0$$

or

(6) $$\lambda - \mu F_y = 0$$

The first order conditions for consumption and production taken together give us the familiar condition that marginal rates of substitution in consumption should equal marginal rates of transformation in production. This familiar necessary condition for Pareto oprimality is not altered by the opportunities of tourism when tourists can be charged separate prices from those faced by citizens. As we will see below this ceases to be true when tourists and domestic consumers face the same prices.

Now let us turn to the conditions obtained from the variables which affect tourism directly, q and z. Differentiating the Lagrangian expression with respect to tourist prices we obtain the equation

(7) $$\sum_i \lambda_i \frac{\partial w_i}{\partial q_{tk}} = 0$$

or, in vector notation

(8) $$\lambda w_{q_t} = 0$$

Differentiating with respect to government expenditures to encourage tourism we obtain the conditions

(9) $$\sum_i \lambda_i \frac{\partial w_i}{\partial z_k} + \lambda_k = 0$$

or, in vector notation,

(10) $$\lambda w_z + \lambda = 0$$

From the first order conditions obtained above we know that the Lagrange multipliers are proportional to the prices which would exist in the domestic economy were we to decentralize. Let us denote the prices faced by domestic producers and consumers by p. Then we can rewrite the above conditions as

(11) $Pw_q = 0$, $\quad pw_z + p = 0$

Looking at these two equations we see that they are the first order conditions for maximizing the profit from tourism, calculated in the prices of the domestic economy, calculated also with prices assumed constant. Thus it is possible to decentralize the tourist industry under government control with the simple instruction to the managers to maximize profits, acting as price takers for producer prices.

We can state this problem as

$$\text{(12)} \quad \underset{q,z}{\text{Maximize}} \quad - Pw(q,z) - Pz$$

It may seem surprising to express this problem with minus signs but it should be remembered that w includes not just the commodities purchased by tourists (at some resource cost to society) but also the foreign exchange they bring with them to purchase these commodities. Since the foreign exchange is what they supply to obtain commodities it appears as a negative net demand. Thus the maximization problem has the familiar form of maximizing revenue less the cost of supplying demand and less the cost of tourist encouraging government expenditures.

We can also approach the problem of decentralization by assuming the tourist industry is left in private (competitive) hands but that taxes are levied on sales to tourists (and not to residents). Let us denote by t the vector of taxes applied on these transactions. Then these taxes are the difference between tourist prices and producer prices, $t = q - p$. Since qw is equal to zero, the problem of maximizing $- pw-pz$ is mathematically equivalent to that of maximizing $tw-pz$. Thus, we can state the problem as

$$\text{(13)} \quad \underset{t,z}{\text{Maximize}} \quad tw(p+t,z) - pz$$

and the first order conditions as[4]

$$\text{(14)} \quad w + tw_q = 0, \; tw_z - P = 0$$

Thus we can restate the first order conditions in this context as: set taxes and have the government spend to encourage tourism to maximize the tax revenue from tourists less the cost of tourist encouragement.

None of the conditions derived thus far will come as a surprise to any economist who has given a moment's thought to this problem. The interesting question is what happens to those simple instructions for tourist management when we introduce various complications. The complication we shall begin with is the fact that by and large tourist trade at the same prices as domestic consumers.

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4. The equivalence of first order conditions (14) and those given above, (11), can be seen by appropriate differentiation of the tourist budget constraint, $(p + t)\, w_z = 0$, $w + (P + t)\, w_q = 0$.

D. Uniform Consumer and Tourist Prices: Lump Sum Redistribution Possible; Price Discrimination Against Tourists Impossible.

To move from the previous model to one where tourists and resident consumers face the same prices, we shall drop the tourist prices, q, as a control variable and replace that with the constraint that tourist prices equal domestic prices. Since consumers will equate marginal utilities with prices (except for a constant of proportionality) we can use the marginal utilities as tourist prices. We can now restate the maximization problem given in (1) above to be

$$\text{(15)} \quad \underset{x,y,z}{\text{Maximize}} \quad U(x) \quad \text{subject to } w(U_x, z) + x = y - z, \quad F(y) = 0.$$

As before, we shall form this into a Lagrangian expression with multipliers λ for market clearance equations and μ for the production constraint:

$$\text{(16)} \quad L(x,y,z,\lambda,\mu) = U(x) - \lambda(w(U_x(x),z) + x - y + z) - \mu F(y).$$

Differentiating the Lagrangian with respect to production supplies and equating with zero we obtain the equations

$$\text{(17)} \quad \lambda_k - \mu \frac{\partial F}{\partial y_k} = 0 \quad \text{or} \quad \lambda - \mu F_y = 0$$

This is the same condition obtained above, that the Lagrange multipliers are proportional to the marginal rates of transformation in production. Thus, if we decentralize production the Lagrange multipliers are the prices, let us call them p, which producers will face.

When we differentiate the Lagrangian with respect to consumption quantities we do not obtain the condition that marginal rates of substitution should equal marginal rates of transformation. Rather, the fact that the profit from tourism depends on the prices which domestic consumers face implies that we shall trade equality of MRS's and MRT's for profit from tourism and the first order conditions for consumer prices will reflect a tradeoff at the margin between these two considerations. Differentiating (16) with respect to x we obtain the condition

$$\text{(18)} \quad \frac{\partial U}{\partial x_k} - \sum_i \lambda_i \sum_j \frac{\partial w_i}{\partial q_j} \frac{\partial^2 U}{\partial x_j \partial x_k} - \lambda_k = 0$$

or in vector notation

$$\text{(19)} \quad U_x - \lambda - \lambda w_q U_{xx} = 0$$

Since marginal utilities are proportional to consumer prices while the Lagrangian multipliers are proportional to producer prices, equation (19) gives an expression for the optimal tax structure. Where there is slope to tourist demands and so monopoly power to exercise. Equation (19) demonstrates the fact that it is no longer desirable to have marginal rates of substitution and transformation equal when consumers and tourists face the same prices. Rather than interpreting this equation in its present form to obtain the rules for the optimal tax structure, we shall wait until the next section where we reformulate the basic model directly in terms of prices and so obtain a more easily interpreted condition.

Let us turn now to government expenditures to encourage tourism. Differentiating the Lagrangian (16) with respect to z we obtain the conditions

$$\text{(20)} \qquad \sum \lambda_i \frac{\partial w_i}{\partial z_k} + \lambda_k = 0 \qquad \text{or} \qquad \lambda w_z' + \lambda = 0$$

Comparing this expression with that obtained in the previous model, equation (9), we see that we have the same condition and it is subject to the same interpretation. We wish to maximize the profits from tourism, calculated at producer prices, or in the presence of decentralization and taxes we wish to maximize the tax revenue from tourism less the cost of expenditures. This remains true even though the taxes are now no longer set just to maximize tax revenue but rather trade off the receipt of revenue from tourists with the wedge driven between domestic MRS's and MRT's caused by also taxing domestic consumers.

E. Income Distribution: No Lump Sum Redistribution: Price discrimination against Tourists Impossible.

Thus far we have assumed that the government has the power to redistribute income however it wishes at no cost. This is clearly an unrealistic assumption. We shall move to the[5] opposite extreme and assume that the government has no direct redistributive powers.[5] Rather, a desirable distribution of income is secured by taxing the goods demanded by those the government wants to redistribute away from and subsidizing those goods which are bought by those the government wished to redistribute towards[6]. We still assume that it is impossible to

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5. This section is an extension of P. Diamond and J. Mirrlees, "Optimal Taxation and Public Production", unpublished.

6. More realistically we could introduce government expenditures for defense, etc., and use the tax powers to collect different amounts of the necessary revenue from different people, but this would not alter the analysis.

set different prices on the same goods ~~taken~~ bought by tourists and domestic consumers. We shall further assume that all production possibilities remain in the hands of the government. Thus domestic consumers receive no lum sum payments. If we know the set of prices which they face, we know both the quantities they demand and the levels of utility which they have. Thus with great generality we can describe the government's objective function as a function solely of prices the consumers face, V(q). We shall write aggregate consumer demands as x(q) using the same notation for the demand function which we previously used for the quantity demanded. We can now state the government maximization as

$$(21)\quad \underset{q,y,z}{\text{Maximize}} \quad V(q) \quad \text{subject to} \quad w(q,z), + x(q) = y - z, \quad F(y) = 0.$$

As before we can form a Lagrangian expression with multipliers λ and μ

$$(22)\quad V(q) - \lambda\left(w(q,z) + x(q) - y + z\right) - \mu F(y)$$

Differentiating with respect to the quantity variables, y and z we obtain the same form of equation which we had before

$$(23)\quad \lambda - \mu F_y = 0 \; ; \; \lambda w_z + \lambda = 0$$

Thus even when lump sum redistribution of income is impossible and income distribution is one of the problems in the economy in the presence of the optimal excise tax structure government expenditures to encourage tourism should be planned to maximize the profits from tourism or equivalently the tax revenue less the cost of the expenditures.

Differentiating the Lagrangian expression with respect to consumer prices, q, we obtain the remaining first order conditions for optimally controlling this economy.

$$(24)\quad \frac{\partial V}{\partial q_k} - \sum_i \lambda_i \left(\frac{\partial w_i}{\partial q_k} + \frac{\partial x_i}{\partial q_k}\right) = 0$$

or, in vector notation

$$(25)\quad V_q - \lambda\left(w_q + x_q\right) = 0$$

First let us examine the expression that comes after the Lagrange multiplier. Recalling that the Lagrangian is proportional to producer prices we see that the right hand expression is equal to the change in value of both tourist and consumer demands, calculated at producer prices, which arises from raising the kth consumer price. In a decentralised setting, we can make use of the relation between consumer prices, producer prices, and taxes, q = p + t, to rewrite this expression. We noted earlier that the tourist had a balanced budget, qw = 0. In this context where there are no lump sum transfers the domestic consumers also have balanced budgets, and so in aggregate qx = 0. Thus, differentiating the budget constraints with respect to prices we obtain

$$(26)\qquad x_k + \sum q_i \frac{\partial x_i}{\partial q_k} = x_k + \sum p_i \frac{\partial x_i}{\partial q_k} + \sum t_i \frac{\partial x_i}{\partial q_k} = 0$$

and $\dfrac{\partial}{\partial t_k}\left(\sum t_i x_i\right) = x_k + \sum t_i \dfrac{\partial x_i}{\partial q_k} = -\sum p_i \dfrac{\partial x_i}{\partial q_k}$

Thus we can substitute this expression in the first order conditions and describe the first order condition as a trade off between tax revenue from raising a tax and the direct impact on social welfare from having a higher consumer price.

$$(27)\qquad V_q + \mu \frac{\partial}{\partial t}\left(tx + tw\right) = 0$$

The exact form of the first order condition will, of course depend on the exact form of the social welfare function. Let us explore the particular case where social welfare can be written as a function of individual utility levels. Let us denote consumer h's demand functions and utility function by $x^h(q)$ and $u^h(x)$. Then we are assuming that social welfare has the form

$$(28)\qquad V(q) = W\left(u^1(x^1(q)), \ldots, u^H(x^H(q))\right).$$

Differentiating this equation with respect t a price we can obtain an alternate expression for the derivative which appears in the first order conditions

$$(29)\qquad \frac{\partial V}{\partial q_k} = \sum_h \frac{\partial W}{\partial u^h} \sum_j \frac{\partial u^h}{\partial x_j^h} \frac{\partial x_j^h}{\partial q_k} = \sum_h \beta^h x_k^h$$

where $\beta^h = \dfrac{\partial W}{\partial u^h}$ times the marginal utility of income and equation (25) is used to complete the analysis.

Thus the first order condition for any tax trades off the tax revenue from raising the tax with the cost to individual consumers, weighted by their social marginal utilities of income, from the increase in a tax. Let us note that if we have a good purchased only by tourists, say good k^*, then social welfare is independent of its price, $\dfrac{\partial V}{\partial q_{k^*}} = 0$. For such a good the government sets the tax rate to maximize tax revenue from tourists. It should be noted that it is not the tax revenue from this good that is maximized but the total tax revenue from tourists.

For example if the Kenya government were considering an embarkation tax for non-residents at the airport it should offset against the revenue of the tax the lost tax revenue to Kenya from any tourists who decide not to come t. Kenya. Similarly, the setting of non-resident game park entrance fees should take into account not only the elasticity of demand for park visits but also the impact on the number of tourists coming to East Africa and the net revenue collected from them outside the parks.

Unfortunately, from the point of view of analytical convenience the East African tax structure does not coincide with that of the model. It is necessary, then, to examine the major East African taxes to determine an appropriate treatment of the model is to be at least approximately applied to measuring the benefits of tourism or to setting policies to maximize those benefits. There are four basic sets of taxes, - sales and excises,customs, company and personal income taxes.

Excise taxes falling on the final sale to consumers, tourists (e.g. Uganda and Tanzania hotel tax) are precisely the tax instruments examined in the model and require no further interpretation to be included in calculating the benefits from having an additional tourist. Most excises however are levied within the production sector rather than on sales to consumers (i.e. most excises are not levied on retail sales). Where there are fixed coefficients between the base of excise taxation and the product sold to the consumer, this does not matter for the tax is fully equivalent to one levied on the final sale. However, there is scope for different combinations of distinction expenditures with a given manufactured good. (This is not so true of the major excises - Kenya and Tanzania on tobacco, beer and spirits, and petrol). This point does not seem too important, and it seems a reasonable approximation to include the full excise tax content of tourist expenditures in calculating marginal benefits.

Customs duties seem similar to excises in the relationship between where they are levied and the cost to consumers, so they can be treated on the same basis. Further, since East African demand is a small proportion of total demand for most goods, the world supply curve can be viewed as infinitely elastic. Thus the price actually paid reflects the marginal cost to East Africa for imports. Taking these considerations together, we can reasonably include the full customs duty content of tourist expenditures in calculating marginal benefits. The task of fitting the company income tax into the model is more complicated, in part due to the complications of the tax. To approach this question, let us consider various simple forms which are related to a company tax. First, we might think of it as pure profits tax. Then, the full value of the tax should be included in the benefits since profits are the excess of the expenditures of tourists over the value of the resources in alternative uses at the margin. Alternatively, we can think of company taxation as a tax on the return to capital (equivalent to a tax which just alters the equilibrium interest rate.[7] In this case, the alternative uses of capital at the margin give the same return and the company tax revenue should not be included in the marginal benefits of tourism. In this case we can think of the tax as levied between the production sector and the owners of capital. The tax would be relevant for calculating the advantages of inducing more foreign capital, say, but is not relevant for evaluating tourism.[8] Taking these two views together, some fraction, probably not too large, of company tax revenue due to tourists should be included in evaluating benefits.

If we think of the personal tax as a tax on transactions between firms and suppliers of services, we have the same case as the second interpretation of the company tax above. Insofar as the gross-of-tax wage represents the alternative value to the production sector of using the resources elsewhere, this tax revenue is not a benefit from tourism.[9]

Taking the above approximations we have the "rock bottom" estimate of the benefits of tourism calculated by Mitchell as a good approximation, with the need to add some company tax revenue and income taxes paid by expatriates and to make allowance for the fact that the East African tax structure is probably not quite optimal, nor has an equilibrium position been selected, since there is an excess supply of labor at present.[10, 11]

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7. See P.A. Samuelson "Tax Deductibility of Economic Depreciation to Insure Valuations," Journal of Political Economy, Dec., 1964.

8. Insofar as the presence of tourists induces a foreign capital flow which would not otherwise be present, the company tax on that capital represents a benefit from tourism. The problem of incorporating foreign production within the economy is, unfortunately, complicated and will be taken up in the future.

9. Again an exception should be made for the personal income tax (and excises and customs) paid by expatriates who would not have come to East Africa if it were not for the additional tourists.

10. Given these limitations on the model, it is possible that the additional income of the previously unemployed should enter the calculation of benefits.

11. A similar problem exists of distinguishing domestic from Foreign airlines and shipping companies. Thus the question of selecting a basis for tariffs as f.o.b or c.i.f. or some things in between requires a similar analysis but is further complicated by the fact that prices are set by international conferences.