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CENTRO RICERCHE ECONOMICHE NORD SUD

POLLUTION ADVERSE TOURISTS AND GROWTH

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Titolo: TOURIST' ADVERSION TO POLLUTION AND GROWTH

ISBN: 978-88-8467-497-5

Prima Edizione: Dicembre 2008

Pollution Adverse Tourists and Growth

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Abstract

We build a growth model in which tourism development generates pollution while tourists are pollution adverse. We establish that long run positive growth exists only for a particular value of tourists pollution adversion. Furthermore, we show that an intensive use of facilities is associated with a lower growth rate for destinations specialized in green tourism. We also see that if the destination can choose the degree of use of facilities, tourism will generate positive growth only if tourists are not too much pollution adverse. In this case the growth rate of the economy will be a negative function of tourists' adversion to pollution so that the "greener" the kind of tourism the destination address to, the slower its growth.

Key words: Pollution, Growth, Tourism Specialization, Use of Facilities

JEL Classifications: O41, Q56, L83.

1 Introduction

The literature on tourism development highlights the role of environmental attractions to explain the success of a destination (Davies and Cahill, 2000 and Tisdell, 2001). But developing tourism implies the building of tourist facilities and the arrival of a large number of visitors. Utilmately, tourism development contributes to increase pollution and might bring to the destruction of the attraction factor. From this point of view, the positive growth performance of the economies specialized in tourism (Brau et al. 2005) might be interpreted as a phase of transition towards the long-run equilibrium characterized by the death of the destination and a zero-growth performance. The aim of this paper is to find the conditions that enables a tourist destination to experience long term positive growth in the presence of pollution.

We build a growth model in which tourism development generates pollution while tourists are pollution adverse. We establish that long run positive growth exists only for a particular value of tourists pollution adversion. Furthermore,

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we show that an intensive use of facilities is associated with a lower growth rate for destinations specialized in green tourism.

We also see that if the destination can choose the degree of use of facilities, tourism will generate positive growth only if tourists are not too much pollution adverse. In this case the growth rate of the economy will be a negative function of tourists' adversion to pollution so that the "greener" the kind of tourism the destination address to, the slower its growth.

This paper mainly refers to the recent literature strand analysing the dynamic evolution of an economy specialized in tourism based on natural resources. Among these works we remind Lozano et al. (2008), which builds a dynamic general equilibrium model where investment in accommodation capacity and public goods are taken into account, Giannoni and Maupertuis (2007) and Candela and Cellini (2006) who adopt the point of view of a representative tourism firm aiming to maximize its lifetime profit, Rey-Maquieira et al. (2005) who analyse the dynamic consequences of the conflict between agricultural and tourism sector for the use of land, Cerina (2007) and Cerina (2008) who introduce several kind of abatement policies and provide the respective analyses of the transitional dynamics of the economy and finally Hernandez and Leon (2007) who present a model of tourist lifecycle highlighting the interactions between natural resources and physical capital. None of these paper, however, face the issue of the conditions for an endogenous, sustained and sustainable growth in an economy specialized in tourism based on natural resources, which is the issue we deal with.

The rest of the paper is organised as follow: section 2 describes the analytical feature of our economy, section 3 presents a discussion on the growth rate of such an economy, section 4 derives the optimal growth rate as a result of the central planner's decision, section 5 analyses the consequences of endogenizing the intensity in the utilization of tourism facilities and section 6 concludes.

2 The analytical framework

2.1 Production of the tourism economy

We consider an economy producing only one kind of good (tourism services) which is supplied in an international tourism market where a large number of tourism economies participate. Tourism services are only sold to non-residents. The production of tourism services implies the building of facilities and the training of human capital in order to make these facilities work. Tourism production is given by the following function

$$T_t^S(k_t) = Ak_t^\eta \tag{1}$$

This supply function is a neoclassical production function. k is the stock of facilities while, for the moment, we simply take A as a scale parameter. In the last section we'll propose an interpretation of A in terms of intensity in the utilization of tourism facilities. In any case, an increase in A allows the

economy to produce more tourism services with the same stock of capital. η is a parameter reflecting the elasticity of tourism supply with respect to capital. For simplicity, we consider that tourism supply is inelastic with respect to the price.

2.2 Tourists preferences

We assume that, at any time, tourists' satisfaction is affected by two factors:

- the stock of tourism facilities supplied by private tourist operators (accommodation, restaurants, leisure facilities) k_t

- the quality of the environment which is measured at each point in time by the intensity of the pollution flow P_t. P_t is an inverse measure of environmental quality, the higher is pollution the lower is environmental quality.

In formalizing tourists' preferences we follow the approach used by Gomez et al. (2004) which relies on the hedonic price theory (Rosen, 1974). Given the above considerations, the willingness to pay for tourism services is then given by

$$q_t = \gamma_t q\left(k_t, P_t\right) \tag{2}$$

We assume $\frac{\partial q_t}{\partial k_t} \geq 0$ (the higher k_t, the higher the quality of the experience for a tourist) and $\frac{\partial q_t}{\partial P_t} \leq 0$ (the higher the level of pollution, the lower the quality of the experience for a tourist). γ is a scale parameter[1].

2.3 The international tourism market, revenues and residents' behaviour

Our economy supplies tourism services in an international tourism market where a large number of small tourism economies participate. It is important to highlight that although international competition fixes the price for a given quality of the services, a country could charge a higher price provided that its services are considered of a higher quality (i.e. characterized by a higher stock of environmental, cultural and social resources) than other countries'. In other words, the international market consists of a continuum of tourism markets differentiated by their quality and the (equilibrium) price paid for the tourism services. In each of them the suppliers are price-takers but they can move along the quality ladder due to changes in their environmental quality and level of facilities.

We assume that each tourist, at any time t, buys one unit of tourism services so that output at time t is measured in terms of tourist entries. The supply side of the economy is made up of a large number of identical "households-firms"

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[1] An increase in γ might reflect the pressure on relative the price of tourism for any perceived quality of tourism services depending on the interplay between growth in foreign income and the luxury nature of the tourism good (Crouch, 1995 and Smeral, 2003) or its small elasticity of substitution with respect to other kinds of goods (Lanza and Pigliaru 1994, 2000)

which we normalize to 1. We assume that the international demand for tourism is infinite for the price level which corresponds to tourists' WTP and is nil for any other price level . So the market clears all the time and the quantity of exchanged is totally determined by the supply side.

Aggregate tourism revenues are represented by the value of the economy's output. If T_t is the level of tourism inflows at time t, this is given by

$$TR_t = \gamma_t q\left(k_t, P_t\right) T_t$$

2.4 Pollution

As in Smulders and Gradus (1996), we consider pollution as a flow. We will consider the following functional form

$$P_t = P\left(k_t, T_t, Z_t\right) \tag{3}$$

We assume $\frac{\partial P}{\partial k} \geq 0$: The construction of facilities generates different kind of pollutions (destruction of biodiversity, visual pollution, waste generation, etc...) that damage the image of the destination. Analogously, we assume $\frac{\partial P}{\partial T}$ positive since, as facilities, tourist inflows generate pollution partly due for example to the over-crowding of tourism sites. Furthermore, when a tourist pollutes a site it has a negative impact on the global quality of the experience for other tourists. Z denote costless abatement and represents the capacity of each specific destination to "resist to pollution". It can be considered as a generic variable which can be affected by several other factors like eco-system features, country-specific characteristics, natural regeneration, different impacts of different kind of tourism and so on. Since Z is meant to gather all the factors which mitigate the effect of k and T on pollution, we assume $\frac{\partial P}{\partial Z} \leq 0$.

3 The rate of growth in a tourism economy

We now face the issue of the determinant of the rate of growth in an economy specialized in tourism. Assuming that residents' income is allocated between consumption of an imported good (sold at a unitary price) and investment in facilities, the dynamic budget constraint of our economy can be written as

$$\dot{k} = q_t T_t - c_t$$

The budget constraint implies that

$$\frac{\dot{k}_t}{k_t} = \frac{q_t T_t}{k_t} - \frac{c_t}{k_t} \tag{4}$$

Relation (4) is quite general and tells us that the growth rate positively depends on income per unit of capital and is negatively affected by the consumtpion-capital ratio. Therefore, if this economy admits a constant steady-state long-run growth rate, it must be the following:

$$g = \frac{q_{ss} T_{ss}}{k_{ss}} - \frac{c_{ss}}{k_{ss}} \qquad (5)$$

Where x_{ss} is the steady state value of the variable x. One can check that the previous condition is verified if and only if the income-capital ratio is constant. Hence,

$$\frac{\dot{q}_{ss}}{q_{ss}} + \frac{\dot{T}_{ss}}{T_{ss}} - \frac{\dot{k}_{ss}}{k_{ss}} = 0$$

and since $\frac{\dot{k}_{ss}}{k_{ss}} = g$, in the long run we have

$$g = \frac{\dot{q}_{ss}}{q_{ss}} + \frac{\dot{T}_{ss}}{T_{ss}}$$

in steady state, the rate of growth of the tourism-specialized economy is equal to the sum of the growth rate of tourists' willingness to pay and of the growth rate of tourist inflows. Moreover, in order for g to be constant, we need both $\frac{\dot{q}_{ss}}{q_{ss}} = g_q$ and $\frac{\dot{T}_{ss}}{T_{ss}} = g_T$ to be constant in steady state.

Log-differenciating (2) and (1) we find

$$\frac{\dot{T}}{T} = \frac{\dot{A}}{A} + \eta \frac{\dot{k}_t}{k_t}$$

$$\frac{\dot{q}_t}{q_t} = \frac{\dot{\gamma}_t}{\gamma_t} + \frac{q_k}{q(k_t, P_t)} \frac{\dot{k}_t}{k_t} + \frac{q_P}{q(k_t, P_t)} \frac{\dot{P}}{P}$$

So that, in the balanced-growth, it must be true that

$$g_T = g_A + \eta g$$
$$g_P = g_\gamma + \alpha(k_{ss}, P_{ss}) g - \beta(k_{ss}, P_{ss}) g_P$$

where g_A, g_γ are the steady-steate growth rate of respectively A and γ. Again, in order for a balanced growth path to exist in a tourism economy, these two values should be constant. Also $\alpha(k_{ss}, P_{ss}) = \frac{q_k(k_{ss}, P_{ss})}{q(k_{ss}, P_{ss})}$ and $\beta(k_{ss}, P_{ss}) = -\frac{q_P(k_{ss}, P_{ss})}{q(k_{ss}, P_{ss})}$, the steady state values of respectively the elasticity of tourists' WTP with respect to facilities and pollution, should be constant too. Since k_{ss} is not constant, P_{ss} may not be constant and g_P may not be zero, we need both α and β to be constant for *any* value of k and P. That means that the only functional form for the WTP which can be compatible with a balanced growth-path in a tourist economy is a cobb-douglas one. Then we must have

$$q(k_t, P_t) = \gamma_t k_t^\alpha P_t^{-\beta}$$

3.1 Growth and pollution

Substituting for the expression for T_{ss} and q_{ss} in (5), we find that

$$g = \gamma_{ss} P_{ss}^{-\beta} A_{ss} k_{ss}^{\alpha + \eta - 1} - \frac{c_{ss}}{k_{ss}} \qquad (6)$$

5

From this expression we can clearly note that the rate of growth is (negatively) affected by the level of pollution. But which are the determinants of pollution? By log-differenciating (3)

$$g_P = \frac{P_k}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)} g + \frac{P_T}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)} g_T + \frac{P_Z}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)} g_Z$$

but since $g_T = g_A + \eta g$, we finally have

$$g_P = g\left(\frac{P_k}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)} + \frac{\eta P_T}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)}\right) + \frac{P_T}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)} g_A + \frac{P_Z}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)} g_Z$$

being g_P constant, we need again g_Z, $\frac{P_k}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)}$, $\frac{\eta P_T}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)}$ and $\frac{P_Z}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)}$ to be constant too. This is tantamount to say that the only functional form for pollution which is compatible to a balanced growth path in a tourism economy is a cobb-douglas one. Hence we set $\phi = \frac{P_k}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)}$, $\varphi = \frac{\eta P_T}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)}$ and $-1 = \frac{P_Z}{P\left(k_{ss}, T_{ss}, Z_{ss}\right)}$ in order to have

$$P\left(k_t, T_t, Z_t\right) = \frac{k_t^{\phi} T_t^{\varphi}}{Z_t}$$

which, by using (1), becomes

$$P_t = \frac{k_t^{\phi+\varphi\eta} A_t^{\varphi}}{Z_t}$$

As a consequence

$$g_P = \left(\phi + \varphi\eta\right) g + \varphi g_A - g_Z$$

It is then clear that, in order to have constant pollution in steady state, we need Z (resistence to pollution) to grow at the following rate

$$g_Z = \left(\phi + \varphi\eta\right) g + \varphi g_A$$

hence, without any abatement effort, environmental quality is doomed to decrease more and more in a tourist economy which experiences a positive and sustained growth in the stock of capital. As long as g is strictly positive, this is true even if $g_A = 0$. Hence, unless we assume some kind of exogenous growth given for example by ever-increasing terms of trade (g_γ positive), we can't have any sustainable tourism (i.e. $g_T \geq 0$, $g \geq 0$, $g_P \leq 0$) without any form of abatement.

3.2   Parameters' restrictions

By substituting for the new expression for pollution in (6) we find

$$g = \gamma_{ss} A_{ss}^{1-\beta\varphi} k_{ss}^{\alpha+\eta-1-\beta(\phi+\varphi\eta)} Z_{ss}^{\beta} - \frac{c_{ss}}{k_{ss}} \tag{7}$$

This is our final expression for the rate of growth of the economy and it deserves some further explanations.

First, it is clear that not only k but also γ (the pressure on the relative price of tourism), A (the capital stock "efficiency") and Z (resistence to pollution) have an important role in determining the rate of growth of the economy.

Second, since $\frac{c_{ss}}{k_{ss}}$ is constant, $\gamma_{ss} A_{ss}^{1-\beta\varphi} k_{ss}^{\alpha+\eta-1-\beta(\phi+\varphi\eta)} Z_{ss}^{\beta}$ should be constant too. An important implication for that is that different assumption on the dynamic behaviour of γ (representing and of A (the capital stock "efficiency") and Z (resistence to capital), would lead to different requirements that the parameters α, β, ϕ, φ and η should satisfy in order for a balanced growth path to be feasible. Since our aim is to focus on the dynamic properties of a tourist economy which experiences some kind of *endogenous* growth, we exclude any kind of exogenous growth in the model and hence we treat γ, A and Z as constant variables[2].

When γ, A and Z are constant, in order to have positive and constant steady-state growth, we need (net) constant returns to scale on the accumulable factor.

Proposition 1 *A necessary condition in order to have a positive steady-state growth in the long run is to have*[3]:

$$\beta^* = \frac{\alpha+\eta-1}{(\phi+\eta\varphi)}$$

Proof. *In order for (net) returns to capital to be constant, we should verify the following equation:* $\alpha - \beta(\phi+\eta\varphi)+\eta-1 = 0$. *This will be true if and only if:*$\beta = \frac{\alpha+\eta-1}{(\phi+\eta\varphi)}$. ∎

	α	η	ϕ	φ
β^*	+	+/-	-	-

Table 1: Steady-state analysis of β^*

The previous table shows how environmental preferences of tourists must evolve due to a change in the value of one parameter in order positive long term growth to occur. Any increase in the love for facilities is associated with an increase in the hate for pollution. Furthermore, any increase in the elasticity of pollution with respect to facilities and/or with respect to tourist flow induces a decrease in pollution aversion. The effect of a change in the elasticity of supply with respect to capital is ambigous. If $\phi + (1-\alpha)\varphi > 0$ (resp. < 0) an increase in η leads to an increase (resp. a decrease) in β^*. In particular, we see that when the love for facility is low any increase in η increases β^*.

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[2] Actually in the last section we will treat A as an endogenous variable and its constancy in steady state will be a result of consumers' optimization.

[3] This condition can obviously be expressed in terms of other parameters. The choice to express it in terms of β is suggested by the fact that β can be considered as a sort of policy tool: different β means different preferences towards pollution and therefore different kind of tourists. The country may influence its β by addressing to different kind of tourism.

If we substitute β for β^*, we obtain that the growth rate is simply

$$\frac{\dot{k}}{k} = \gamma A^{1-\beta^*\varphi} Z^{\beta^*} - \frac{c}{k}$$

And this is also true in steady-state so that:

$$g = \gamma A^{1-\beta^*\varphi} Z^{\beta^*} - \frac{c_{ss}}{k_{ss}} \tag{8}$$

Even if γ, A and Z are constant variables in our model, it is useful to draw some comparative statics conclusions. In particular we can easily see that an exogenous increase in γ (higher pressure on the relative price of tourism) will increase the growth rate of the economy. The same conclusion can be drawn concerning the resistance to pollution, Z: ceteris-paribus, an increase in the capacity of the economy to resist to pollution will allow a faster growth. As long as we let γ and Z to be "country-specific" or associated to the particular kind of tourism good produced, they can have a role in explaining some cross-country difference in the growth rate.

As for A, we can conclude that it is not always good for growth. If $\beta^* > \frac{1}{\varphi}$, a higher level of A implies a slower growth rate. If pollution aversion and the impact of tourists on pollution are too high, the more efficient is a unit of capital, the slower the destination grows. This result has some interesting implications as long as we can associate a high level of β^* with green tourism and a low level of β^* with what one call mass tourism. In particular, a destination producing green tourism $(\beta^* > \frac{1}{\varphi})$[4] will experience high growth rates in the long run provided the efficiency of each unit of capital is low enough. The reverse is true for a destination producing mass tourism.

4 The optimal growth rate

In the previous section we established the necessary conditions to obtain a positive and sustained growth. The problem is now to compute this growth rate as a result of residents' maximizing behaviour. Residents' aggregate utility, at time t, is positively influenced by the aggregate level of consumption at time t of a homogenous good purchased from abroad at a unitary price c_t.

$$U_t = \int_t^\infty u\left(c_t\right) e^{-\rho t} dt = \int_t^\infty \ln c_t e^{-\rho t} dt \tag{9}$$

We assume there is a benevolent central planner whose objective is to choose the consumption plan in order to maximize (9) respecting the dynamic budget constraint which can be expressed as

$$\dot{k} = \gamma A^{1-\beta\varphi} k_t^{\alpha+\eta-\beta(\phi+\varphi\eta)} Z^\beta - c_t \tag{10}$$

---

[4]Notice that $\beta^* \geq \frac{1}{\varphi}$ requires $\varphi > \frac{\phi}{\alpha-1}$ and then α greater than 1.

In the previous section, we shown that positive constant growth exists only for a particular combination of paramenter values such that $\beta = \beta^*$. As long as we look for a positive constant growth, we will use β^* instead of β. In this case the accumulation equation simply becomes

$$\dot{k} = \gamma A^{1-\beta^* \varphi} k_t Z^{\beta^*} - c_t \tag{11}$$

After substituting for the value of P_t, the hamiltonian looks as follows

$$H = \ln c + \lambda \left(\gamma A^{1-\beta^* \varphi} k_t Z^{\beta^*} - c_t \right)$$

First-order and Euler conditions are the following

$$
\begin{aligned}
H_c &= 0 : \frac{1}{\lambda} = c \\
\dot{\lambda} &= \lambda \left(\rho - \gamma A^{1-\beta^* \varphi} Z^{\beta^*} \right)
\end{aligned}
$$

From these equations we obtain the growth rate of consumption over time:

$$\frac{\dot{c}}{c} = \gamma A^{1-\beta^* \varphi} Z^{\beta^*} - \rho$$

which, in conjunction with (11) gives us the dynamic system describing the evolution of the economy over time.

We know that, along the balanced growth path, $\frac{\dot{c}}{c} = \frac{\dot{k}}{k} = g$, hence

$$g = \gamma A^{1-\beta^* \varphi} Z^{\beta^*} - \rho$$

Equating this equation with (8), we find the optimal steady-state consumption-capital ratio which is equal to

$$\frac{c_{ss}}{k_{ss}} = \rho$$

This model is similar to Rebelo (1991). This means that there is no transitional dynamics so that the growth rate is constant over-time and that the consumption-capital ratio is equal to ρ all along the time-path. But if in the Rebelo model any growth in A increases the growth rate, it is not the case in our model due to tourists adversion for pollution.

5   Endogenizing A

As long as an increase in A allows for larger tourist inflows using the same amount of capital stock, it can be interpreted as an increase in the intensity according to which existing facilities are used.

From this point of view, the value of A may be associated to the degree of utilization of tourism structure, that is, the lenght of the tourism season[5]. Insofar residents are those who decide how long such facilities should be kept open and available to foreign tourists, the level of A might be treated as a further control variable. In choosing the optimal value of A, residents should trade-off between benefits and costs of it: a higher value of A leads to larger tourism inflows and then to higher income and higher growth (if $\beta^* < \frac{1}{\varphi}$). However, a higher A entails a higher direct cost (a longer tourism season means a harder work and we assume residents are work-adverse) and an indirect cost, which is associated to the higher pollution flow due to the increase in tourist inflows.

In this case residents' utility might be represented by

$$U_t = \int_t^\infty u\left(c_t, A_t\right) e^{-\rho t} dt = \int_t^\infty \left(\ln c_t - A_t^{1+\omega}\right) e^{-\rho t} dt \tag{12}$$

where $\omega > 0$ and $1 + \omega$ reflects residents' disutility to work

The benevolent planner maximizes (12) under the same budget constraint (11).

The Hamiltonian of this function is:

$$H = \ln c - A^{1+\omega} + \lambda \left(\gamma A^{1-\beta^* \varphi} k Z^{\beta^*} - c\right)$$

The Maximum principle gives:

$$H_c = 0 : \lambda = \frac{1}{c}$$

$$H_A = 0 : \lambda = \frac{(1+\omega) A^\omega}{\gamma \left(1 - \beta^* \varphi\right) A^{-\beta^* \varphi} k Z^{\beta^*}}$$

$$H_k = \rho \lambda - \dot{\lambda} : \dot{\lambda} = \lambda \left(\rho - \gamma A^{1-\beta^* \varphi} Z^{\beta^*}\right)$$

Substituting λ in the previous equations, we obtain the optimal growth rate of consumption:

$$\frac{\dot{c}}{c} = \gamma A^{1-\beta^* \varphi} Z^{\beta^*} - \rho$$

As in the previous section, we can check that at every point in time the ratio $\frac{c}{k}$ is equal to ρ.

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[5] It should be noted that in interpreting an increase in A as a longer tourism season, we are only considering one particular aspect of it, specifically, the increase in the number of tourist *per unit of time* (say a year). We are then leaving aside other important aspect related to the increase in the lenght of the season like the decrease in the concentration of tourists per unit of time (which might have a positive effect on pollution and then on the willingness to pay). The analytical framework we propose in this work is not suitable to deal with this complex issue and then we leave its analysis to future research.

By solving the system we find that the optimal lenght of the season A is constant over-time and is equal to:

$$A = \left(\frac{(1 - \beta^* \varphi) \gamma Z^{\beta^*}}{(1 + \omega) \rho} \right)^{\frac{1}{\omega + \beta^* \varphi}}$$

It is worth to observe that a meaningful (positive) value of A requires $\beta^* < \frac{1}{\varphi}$. In other words, if tourists are *too* adverse to pollution, residents find it optimal to keep tourists structure closed for the whole year. An important implication for that is that, in this case, the rate of growth of the economy is always a positive function of the optimal A.

It is possible to substitute A for its optimal in the growth rate in order to obtain:

$$g = \gamma^{1 + \frac{1 - \beta^* \varphi}{\omega + \beta^* \varphi}} Z^{\beta^* + \frac{1 - \beta^* \varphi}{\omega + \beta^* \varphi}} \left(\frac{1 - \beta^* \varphi}{(1 + \omega) \rho} \right)^{\frac{1 - \beta^* \varphi}{\omega + \beta^* \varphi}} - \rho$$

One can observe that any exogenous increase in the willingness to pay γ or in the capacity of the destination to resist to pollution Z is beneficial for growth. Moreover the higher β^*, or tourists' impact on pollution, the slower the growth rate. And, clearly enough, the larger residents' disutility to work ω, the slower the growth rate.

6   Conclusion

In this paper, we investigate the impact of tourist's adversion to pollution on the growth rate of an economy specialized in tourism.

We built a model of optimal growth and we shown that the destination can experience endogenous growth. In fact, there exists for each destination a unique level of pollution adversion (β^*) that enables the destination to have a positive and constant growth.

Our model is akin to Rebelo (1991) but we found that because of pollution adversion a higher level of productivity of capital is not always associated with a higher growth rate. More precisely, we established that for a destination specialized in green tourism (high level of β^*), there exists a negative relationship between the "efficiency of capital" and the rate of growth. It means that an intensive use of the capital stock may be harmful to growth when you produce green tourism.

Furthermore, under the assumption that the destination can choose the lenght of the season, we observed that if tourists' adversion to pollution is too high then the growth rate will tend to zero. It means that if tourists really hate pollution one should not develop tourism.

This paper raises some interesting problems that should be confirmed by developing a framework in which the supply side is modeled in a more detailed way.

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