

# On the Implications of Tourism Specialization and Structural Change in Tourism Destinations

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## Abstract

We explore the relationship between tourism specialization and structural change in an endogenous growth model, analyzing its implications for both economic growth and tourist flows. We consider a two-sector economic growth model where the development of tourism activities generates a production externality and a structural change which modifies the resources-use intensity, ultimately affecting tourist flows. We characterize the balanced growth path equilibrium and analyze under which conditions structural change may generate fast economic growth, providing a theoretical support for the empirical evidence on tourism countries. We also show that structural change may alternatively lead to stages of rejuvenation, stagnation or decline consistently with what advanced by the tourism area life cycle hypothesis. By combining these different results, we also show that an eventual phase of decline generated by structural change does not necessarily have to be interpreted as a poor economic outcome since there might exist a bell-shaped relationship between residents' income and number of visitors.

**Keywords:** Tourism Specialization, Structural Change, Economic Growth, Tourism Area Life Cycle

**JEL Classification:** O40, O41

## 1 Introduction

Tourism specialization represents an important source of development for several developing countries. Both the theoretical (Hazari and Sgro, 1995; Schubert et al., 2011; Marsiglio, 2015) and empirical (Lanza and Pigliaru, 2000; Lanza et al., 2003; Brau et al., 2007) literature agree that to a large extent tourism specialization is a successful tool to promote rapid economic growth. Indeed, during the last decades several tourism economies (especially small island countries) have experienced fast growth and rapid increases in their living standards (Lanza et al., 2003). However, whether such an outcome represents a long run or only a short run trend cannot be determined a priori, since tourism specialization substantially affects the nature of economic activities and distorts the sectoral composition in tourism destinations, eventually giving rise to perverse mechanisms with negative long run consequences (i.e., Dutch disease effects, land competition, environmental exploitation, low-education traps). The single most important way in which tourism specialization may affect economic activities is through the structural change channel. Several papers document the structural changes associated with tourism specialization (see McLennan et al., 2012, for a recent survey of the transformation induced by tourism development on the economy), but to the best of our knowledge the theoretical literature has remained silent on their implications on economic performance of tourism destinations. McLennan et al. (2012) emphasize how tourism has often replaced more traditional industries like

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agriculture, while WTTC (2012, 2013) stresses how the contribution of tourism to GDP has been increasing over time and will tend to keep rising also in the future. Thus understanding the implications of this phenomenon may help predicting tourism evolution and improving tourism policy making. Very few papers have tried to discuss the effects of structural change on the development of tourism destinations thus far. Smeral (2003) proposes a static theoretical model driven by productivity differentials between manufacturing and tourism sectors, and by structural change in demand to understand the determinants of tourism growth; however, by lacking a dynamic dimension, very little can be learnt from his model since economic growth and tourism development are dynamic entities by definition. Hernandez-Martin (2008) proposes structural change, in the sense of a sectoral shift from the agriculture to the tourism sector, as an explanation of the fast growth experienced by small island tourism countries; his analysis is however mainly empirical and, as the author himself recognizes, his conclusions cannot be taken as definitive due to data limitations. Indeed, tourism as a sector cannot be clearly defined thus understanding what are the implications of tourism specialization on traditional macroeconomic sectors and thus on economic performance is not straightforward. Due to the lack of theoretical research on this issue, our paper represents a preliminary attempt to investigate from a theoretical perspective the mutual relationships among structural change, economic growth and tourism development. In particular, we try to understand what a sectoral change might imply for the number of tourists a destination receives and for the economic performance of the destination itself. As a first step in this direction, we do not investigate how tourism specialization determines structural change, but we simply analyze its implications of structural change on a tourism-based economy.

Among the possible explanations of the relationship between economic development and tourism specialization, the most widely discussed theory in literature is probably the tourism area life cycle (TALC) hypothesis, advanced by Butler (1980) by reinterpreting the product life cycle theory to describe how a tourism destination may go through different phases during its lifetime. This theory conjectures that tourism destinations may eventually experience several phases of development characterized by different factors including the number of visitors, tourists' motivations, the residents' perception of the tourism phenomenon, or the amount of environmental damages (Lozano et al., 2008). In its original version it focuses only on the evolution of the number of visitors as a response to tourism development in the tourism destination. Specifically, in its simplest form the TALC hypothesis claims that a tourism destination may go through five different stages, four of which are common to all destinations (exploration, involvement, development and consolidation) while the fifth is destination-specific since depending upon its capacity to face international competition. Indeed, according to the tourism policies and strategies implemented a destination may end up facing alternatively decline, stagnation or rejuvenation<sup>1</sup>. Thus, by plotting number of tourists against time it is possible to obtain a curve (what we may refer to as the "tourist curve" for expositional simplicity) summarizing the tourism pattern hypothesized by the TALC, and such a curve turns out to be upward sloping during the first four stages while it may be upward or downward sloping or even flat according to what is experienced in the fifth stage (rejuvenation, decline or stagnation, respectively). Specifically, during each of the exploration, involvement, development and consolidation stage, the number of tourists will tend to increase over time (the curve will be upward sloping) but at different rates (it might be concave or convex); specifically, in the original TALC formulation, the tourists curve is convex in the earlier three phases while it becomes concave at consolidation. During the last stage the number of tourists might decrease, increase or remain stable characterizing decline, rejuvenation or stagnation, respectively (the curve will be either downward or upward sloping or even flat). A huge body of empirical studies analyzes the extent to

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<sup>1</sup>Note that the TALC hypothesizes that all destinations experience also a phase of stagnation, and in order to fight stagnation a destination may implement different policies with positive (rejuvenation), negative (decline) or no effects (stagnation) on tourist activities. In our analysis, since we focus on a balanced growth path equilibrium, for the sake of simplicity we do not consider that every destination has to stagnate before implementing certain policies in order to fight international competition. We will not model such policies but we will simply analyze what might be the implications of a structural change associated with tourism specialization.

which such predictions of the TALC are consistent with the real world experiences, finding mixed results (see Lagiewski, 2006, for a concise survey). Despite several works show that real world destinations depart even significantly from it, the TALC still remains an important framework to conceptualize tourism development. Indeed, different theories (see Lundtorp and Wanhill, 2001; and Lozano et al., 2008) discuss whether and why a development pattern consistent with that hypothesized by TALC might occur; none of these, however, is able to clarify the mechanisms generating TALC-like dynamics.<sup>2</sup> In this paper we contribute to this literature by analyzing the role that structural change might play in explaining how different phases consistent with the predictions of the TALC may emerge.

This paper wishes thus to explore from a theoretical point of view the relationship between tourism specialization and structural change, and its implications for economic growth and tourist flows. Thus, the aim of this paper is twofold. First, we develop a simple macroeconomic model driven by structural change in order to understand how a sectoral shift associated with tourism specialization may impact on economic growth rates both in the long and short run. Specifically, by adopting a balanced growth path (BGP) equilibrium approach, traditionally employed in the economic growth literature, we analyze under which conditions along the BGP a sectoral shift might be beneficial for economic growth, and whether such a beneficial effect might have permanent long run consequences. Second, we try to provide a simple explanation of why we might observe an evolution of tourist flows in line with that conjectured by the TALC hypothesis. In particular, we analyze under which conditions along the BGP structural change might give rise to phases of rejuvenation, stagnation or decline. Therefore, apart from the already mentioned literature on structural change and tourism specialization, our paper is related to another branch of the tourism economics literature, analyzing the determinants of economic performance in tourism destinations. In this framework, two alternative theoretical approaches have been discussed, relying on dynamic models of trade (Hazari and Sgro, 1995; Lanza et al., 2003; Schubert et al., 2011) and tourism capital driven growth models (Cerina, 2007; Lozano et al., 2008; Marsiglio, 2015, 2017). However, our approach in this paper differs from both of them since we rely on a traditional two-sector endogenous growth model in order to characterize the dynamic effects of structural change on both economic growth and tourist flows.

The paper proceeds as follows. Section 2 introduces our model which consists of an endogenous growth model à-la Lucas-Uzawa (1988) driven by human capital accumulation. Tourism specialization plays two different roles, since it determines a production externality distorting the production of final output and it generates a structural change shifting economic activity in favor of one of the two forms of capital. Tourists are attracted into a tourism destination by its stock of natural and tourism capital (what we refer to as physical capital). Section 3 focuses on the equilibrium outcome showing that in our setting along the BGP, fast economic growth may be consistent with a sectoral shift associated with tourism specialization. However, whether this is effectively the case depends on the size of an externality parameter measuring the impact of tourism specialization on overall economic activities. We also show that along the BGP, structural change may give rise to an evolution of the number of tourists consistent with the tourist curve conjectured by the TALC hypothesis; the direction and the intensity of structural change determines whether the tourism destination may end up in a phase of decline, rejuvenation or alternatively stagnation. Section 4 shows that an eventual reduction in tourist flows generated by structural change may not necessarily represent a poor outcome for the tourism destination since there might exist a bell-shaped relationship between residents' income and number of visitors. Such a result suggests that policy aiming to foster economic growth in tourism destinations may need to be different in earlier and later stages of economic development. Section

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<sup>2</sup>Specifically, Lundtorp and Wanhill (2001) develop a model of tourism market giving rise to a logistic differential equation describing the evolution of tourist flows; clearly its solution shows an S-shaped pattern as that hypothesized by the TALC. However, their approach basically consists of assuming a logistic dynamics without explaining how different phases may emerge. Lozano et al. (2008) develop a growth model of tourism and environment giving rise to a logistic evolution of tourist flows; however, the mechanism underlying this outcome cannot be explained since the model does not show any analytical solution. Moreover, both the settings in Lundtorp and Wanhill (2001) and Lozano et al. (2008) cannot explain why a phase of rejuvenation, stagnation and decline may occur.

5 discusses the role of our modeling assumptions and their implications for the effective ability of the model to describe the development experience of tourism-based economies, pointing out how our model is best suited to analyze small island countries in which tourism accounts for a substantial share of GDP. Section 6 presents concluding remarks highlighting directions for future research. All technicalities and proofs of propositions, along with an extension of our baseline model, are presented in appendices A, B and C.

## 2 The Model

We analyze a two-sector endogenous growth model á-la Uzawa-Lucas (1988) within a simple open economy framework. The unique final good produced by domestic firms is consumed by both resident households and international tourists; other than consuming residents also save and invest, while tourists consume only. Tourists' consumption activities are a source of additional demand which stimulates domestic production giving rise to a production externality. Tourism consumption is the only source of exports and tourism receipts are entirely used to finance imports, such that the trade balance is in equilibrium at any moment in time. Specifically, domestic households receive the rental rates of the two capital stocks they own (physical and human capital), buy the consumption goods and choose how much to save and invest in human capital formation. There is full employment such that the constant (normalized to 1) population coincides with the labor force, thus per capita and aggregate variables perfectly coincide. Domestic firms competitively produce the unique final good, remunerating each input at its marginal product. The term physical capital in the paper is used to refer to a broad concept of capital, different from human capital, encompassing both tourism capital (hotels, restaurants, and other recreational facilities) and natural capital (land, beaches, and other natural amenities); we use the term physical capital to distinguish such a broad notion of capital from human capital, which represents the engine of long run growth. International tourists are attracted into the domestic economy by the stock of tourism and natural capital (i.e., the stock of physical capital) available in the tourism destination.

The representative (resident) household-firm agent seeks to maximize his welfare subject to the dynamic evolution of physical and human capital, by choosing how much to consume,  $c_t$ , and which share of human capital to employ in final production activities,  $0 < u_t < 1$ . Welfare is given by the infinite discounted sum (with  $\rho$  being the time preference rate) of instantaneous utilities, which depend on consumption,  $c_t$ , and number of visitors,  $z_t$ ; the instantaneous utility function takes a separable iso-elastic form:  $u(c_t, z_t) = \frac{c_t^{1-\sigma} - 1}{1-\sigma} + \epsilon \ln z_t$ , where  $\sigma > 1$  measures the inverse of the intertemporal elasticity of substitution and  $\epsilon \in \mathbb{R}$  the weight attached to the presence of visitors in (resident) household's preferences (if  $\epsilon > 0$  residents are tourism lover, if  $\epsilon = 0$  tourism indifferent, while if  $\epsilon < 0$  tourism averse; see Marsiglio, 2016). Physical capital,  $k_t$ , accumulation is given by the difference between final output, net exports,  $nx_t$ , and consumption:  $\dot{k}_t = y_t - nx_t - c_t$ ; output is produced through a Cobb-Douglas production function:  $y_t = a_t(u_t h_t)^\alpha k_t^{1-\alpha}$ , combining physical and human,  $h_t$ , capital, where  $a_t$  measures the total factor productivity while  $\alpha$  and  $1 - \alpha$  the human and physical capital's shares of income, respectively; net exports are the difference between exports (coinciding with tourism receipts),  $x_t = \beta z_t$  where  $\beta$  is the amount of output consumed by each tourist, and imports,  $m_t$ ; the trade balance is in equilibrium at any time such that  $x_t = m_t$  and thus  $nx_t = 0$ . Human capital accumulates instead according to the production of new human capital:  $\dot{h}_t = \theta(1 - u_t)h_t$ , where  $\theta > 0$  is the productivity of human capital employed in new human capital formation. Given the physical and human capital initial conditions,  $k_0 > 0$  and  $h_0 > 0$ , the representative resident's problem can be stated as follows:

$$\max_{c_t, u_t} \quad W = \int_0^\infty \left( \frac{c_t^{1-\sigma} - 1}{1-\sigma} + \epsilon \ln z_t \right) e^{-\rho t} dt \quad (1)$$

$$s.t. \quad \dot{k}_t = a_t(u_t h_t)^\alpha k_t^{1-\alpha} - c_t \quad (2)$$

$$\dot{h}_t = \theta(1 - u_t)h_t. \quad (3)$$

Some comments on the above problem are needed in order to clarify the effects of tourism development on the economic and tourism performance of the destination. First of all, tourism is clearly desirable for the domestic economy since it allows to finance imports (Hazari and Sgro, 1995; Nowak et al.; 2007). Moreover, tourism generates a utility externality, since the number of visitors in the destination crucially (positively, negatively or not at all) affects residents' utility according to the sign and size of  $\epsilon$ . However, tourism by generating additional demand stimulates domestic production determining a production externality affecting the total factor productivity,  $a_t$ , which in turn determines the attractiveness of the tourism destination among international tourists which thus determines how many visitors will be attracted in the destination. Looking more specifically at this latter channel is thus essential in order to understand the nature of the tourism and economic development relationship. Specifically, we assume that the total factor productivity depends on the relative abundance of the two capital stocks, and in particular it depends nonlinearly on the physical to human capital ratio,  $\frac{k_t}{h_t}$ , as follows:

$$a_t = \left( \frac{k_t}{h_t} \right)^\phi, \quad (4)$$

where  $\phi \in \mathbb{R}$  quantifies the production externality. Such an externality is driven by tourism specialization, which somehow distorts the intensities of physical and human capital contribution into overall economic activity, making output more or less dependent upon the two different forms of capital. Specifically, whenever  $\phi < \alpha$  ( $\phi > \alpha$ ) an increase in the human capital stock raise (reduces) its marginal productivity in output production. These two different cases represent two alternative scenarios for the tourism and growth nexus. Indeed, in the former case (i.e.,  $\phi < \alpha$ ) tourism specialization is overall beneficial for economic activity which gets distorted in favor of the engine of long run growth (i.e., human capital); in the latter case (i.e.,  $\phi > \alpha$ ) tourism specialization is detrimental for economic activity which is distorted away from the engine of growth. In the following we will refer to these two situations as the “*positive tourism externality*” and “*negative tourism externality*” case, respectively<sup>3</sup>; these two situations are consistent with the optimistic and pessimistic view on the tourism and growth relationship discussed in Brau et al. (2007). Note that when  $\phi = \alpha$  output will not depend on human capital, thus such a case turns out to be not useful to assess the impacts of a sectoral shift induced by tourism specialization; therefore, in the proceeding we will focus only on the case in which  $\phi \neq \alpha$ .

Economic production affects tourists' perception of the tourism destination, thus it determines the number of tourists,  $z_t$ , who will choose to visit the destination. Specifically, we assume that tourist flows depend on the physical capital concentration in the technology used to produce final output<sup>4</sup>:

$$z_t = \eta k_t^{\psi(1-\alpha)}, \quad (5)$$

where  $\eta > 0$  is a scale parameter while  $\psi > 0$  measures the importance of physical capital in tourists' preferences. Equation (5) states that tourists are attracted into a specific destination by its stock of physical assets, which remember is inclusive of both tourism and natural capital; this is consistent with the tourism and growth literature which claims that tourists' willingness to pay for tourism services depends on both human-built facilities and natural and aesthetic amenities (Cerina, 2007; Marsiglio, 2015). Differently from this branch of the tourism economics literature, apart from their impact on utility, we do not model how

<sup>3</sup>Specific examples of tourism production externalities are related to how tourism activities impact capital goods and the skill requirements of the labor force. For example a mass-type tourism may need more facilities and more unskilled labor (negative tourism externality), while niche tourism may need less facilities but more skilled labor (positive tourism externality). Therefore, according to the peculiarities of the specific tourism activities in the destination, economic production may get distorted in favor of physical or human capital.

<sup>4</sup>Note that such a formulation implies that, since tourist flows are determined only by physical capital, human capital does not affect in any way tourist dynamics. It may be more realistic to assume that also human capital plays a role, especially if human capital is meant in a broad sense to include both cultural and social capital. It is however possible to show (see appendix C) that even in a more general and complicated setting our main results will still apply.

tourists interact with the tourism destination and which kind of problems their activities may generate on the local economy (see Cerina, 2007, and Marsiglio, 2015, for an analysis of the environmental problems caused by tourist inflows). Note that according to the previous equation the number of visitors is endogenously determined by the choices of residents regarding physical and human capital accumulation.

### 3 BGP Analysis

The optimization problem (1) - (3), along with the tourism-related externality effects (4) and (5), characterizes the development pattern of the tourism destination in our specific setting. In order to proceed in our analysis of economic and tourism performance in the tourism-based economy, we focus on a BGP equilibrium along which all the variables grow at constant rates. Next proposition summarizes the properties of the BGP, where we denote with  $\gamma_x \equiv \frac{\dot{x}_t}{x_t}$  the growth rate of variable  $x_t$ .

**Proposition 1.** *Assume  $\theta > \rho$ ; then the economy converges towards a BGP equilibrium, along which the economic and tourist flows growth rates are respectively given by:*

$$\gamma \equiv \gamma_c = \gamma_k = \gamma_h = \gamma_y = \frac{\theta - \rho}{\sigma} > 0 \quad (6)$$

$$\gamma_z = \psi(1 - \alpha)\gamma > 0, \quad (7)$$

while the human capital share devoted to final goods production is equal to:

$$\bar{u} = \frac{\theta(\sigma - 1) + \rho}{\theta\sigma} \in (0, 1). \quad (8)$$

**Proof.** See appendix A. ■

The condition in Proposition 1 saying that the human capital productivity into new human capital formation is larger than the time preference rate is standard in the growth literature and it allows the BGP equilibrium to be well defined (Barro and Sala-i-Martin, 2004). Provided that this is the case, all economic variables grow at the common rate  $\gamma$ , and the tourist flows grow at a proportional rate  $\gamma_z$  which may be equal to or different from  $\gamma$  according to the value of  $\psi(1 - \alpha)$ . Note that along the BGP, the growth rates and the human capital allocated to the final output production are unaffected by the tourism-driven production externality ( $\phi$ ) and the tourism aversion parameter ( $\epsilon$ ).

Recall that we mainly wish to determine what a structural change might imply for the economic performance and tourism performance (i.e., tourist inflows) in the tourism destination. Indeed, tourism specialization, apart from determining the production externality distorting the production of final output, also generates some structural change shifting economic activity in favor of one of the two forms of capital, further distorting the production of final output. Specifically, we assume that it generates a sectoral shift, leading to a gradual and permanent change in the physical and human capital's shares (a variation in  $1 - \alpha$  and  $\alpha$ ), along the lines of Marsiglio et al. (2016). Since the tourism sector cannot be clearly defined and thus it is not possible to clearly understand how a sectoral shift towards the tourism sector might affect overall other macroeconomic sectors<sup>5</sup> (Hernandez-Martin, 2008; WTTC, 2012), we allow for the share of physical capital to either rise or fall (i.e.,  $1 - \alpha$  may increase or decrease) and analyze what this might imply for the economic performance of the tourism destination and the number of tourists it receives. Several papers discuss the structural changes associated with tourism specialization (McLennan et al., 2012), thus we do not examine why a sectoral shift occurs and we rather focus on its implications for the tourism destination.

<sup>5</sup>In his empirical analysis of the implications of structural change in tourism destinations, Hernandez-Martin (2008) stresses that: "... tourism is not a clearly defined and easily identifiable economic sector, despite the generalised use of the term tourism sector. In reality, the tourism economy is related to tourist expenditure on a wide variety of goods and services. Consequently, the identification of the implications of sectoral shift on tourism countries requires much disaggregation of the statistical information, given that the sectoral shift occurs in favour of a wide group of activities both directly and indirectly related to tourism".

In order to understand how a sectoral shift affects economic performance, note first that along the BGP income increases at a constant rate; in order for a sectoral shift to give rise to fast increases in income as shown by empirical evidence, we would need to observe a steep increase in income as a response to such a sectoral shift. We need thus to analyze the relation between income ( $y_t$ ) and the share of physical capital ( $1 - \alpha$ ) to understand under which conditions this may effectively happen. Some algebra (see appendix B) allows us to write:  $y_t = \bar{u}^{-\frac{\alpha}{\phi-\alpha}} \left(\frac{r}{1-\alpha}\right)^{\frac{1+\phi-\alpha}{\phi-\alpha}} h_t$ , where  $r \equiv \frac{\theta\sigma-\varphi\rho}{\sigma-\varphi}$ , which differentiated with respect to  $1 - \alpha$  yields:

$$\frac{\partial y_t}{\partial(1-\alpha)} = h_t \left(\frac{r}{1-\alpha}\right)^{\frac{1+\phi-\alpha}{\phi-\alpha}} \bar{u}^{-\frac{\alpha}{\phi-\alpha}} \left[ \frac{\phi \ln \bar{u}}{\phi-\alpha} - \frac{1}{\phi-\alpha} \ln \left(\frac{r}{1-\alpha}\right) - \frac{1+\phi-\alpha}{1-\alpha} \right].$$

If  $\phi > \alpha$  the above expression is negative, while if  $\phi < \alpha$  two cases are possible. (i) If  $\ln\left(\frac{r}{1-\alpha}\right) > \frac{(1+\phi-\alpha)(\alpha-\phi)}{1-\alpha} + \phi \ln \bar{u}$ , then the above derivative is positive; while (ii) if  $\ln\left(\frac{r}{1-\alpha}\right) < \frac{(1+\phi-\alpha)(\alpha-\phi)}{1-\alpha} + \phi \ln \bar{u}$ , then the derivative is negative, provided that the following condition  $\phi \in (\Lambda_1, \Lambda_2)$  holds true, where  $\Lambda_1 = \frac{1}{2}[\omega - \sqrt{\omega + 4\varepsilon}]$  and  $\Lambda_2 = \frac{1}{2}[\omega + \sqrt{\omega + 4\varepsilon}]$  with  $\omega = (2\alpha - 1) + (1 - \alpha) \ln \bar{u}$  and  $\varepsilon = \alpha(1 - \alpha)$ . We can thus conclude that the relation between income and the physical capital share strictly depends on the relative size of  $\phi$  and  $\alpha$ , that is on whether the tourism externality is positive or negative. This allows us to summarize in the following proposition in which cases a structural change may give rise to fast economic growth.

**Proposition 2.** *Along the BGP equilibrium, a fast rise in economic performance (i.e., an increase in  $y_t$ ) may occur as a result of structural change. This may be consistent with a decrease in the physical capital share (i.e., a fall in  $1 - \alpha$ ) if the tourism externality is negative, that is  $\phi > \alpha$ ; or also if the tourism externality is positive, that is  $\phi < \alpha$ . It may also be consistent with an increase in the physical capital share (i.e., a rise in  $1 - \alpha$ ) in the positive tourism externality case, that is  $\phi < \alpha$ .*

Proposition 2 allows to understand how structural changes and the economic performance in a tourism destination are related. A period of fast increases in economic performance can occur whenever tourism specialization generates either a positive or negative productive externality. Under a positive externality an increase in economic growth can occur whatever is the direction of the sectoral shift (namely, in favor of physical or human capital); under a negative externality an increase in economic growth can occur only whenever the physical capital share decreases. The results are intuitive if we consider that along the BGP the effect of a sectoral shift on income needs to be balanced with the effect induced by capital accumulation. Whenever the externality is positive (production becomes more human capital intensive), income may receive a boost whatever is the direction of the sectoral shift. Whenever the externality is negative (production becomes less human capital intensive), income may increase only if the direction of the sectoral shift is in favor of human capital thus counterbalancing the externality effect.

In order to simply visualize the consequences of structural change on economic performance, we run a simple numerical simulation showing how the magnitude of the tourism-induced production externality affects the evolution of income. Since  $\epsilon$  is irrelevant for our results we set its value equal to zero (representing a situation in which residents are tourism indifferent), and since  $\eta$  and  $\psi$  do not affect the BGP we arbitrarily set them to strictly positive values. We then calibrate the remaining parameter values to obtain a BGP growth rate of 3%, while the physical capital share is set initially to 0.5 and then to gradually fall or rise over time. Specifically, we set  $\epsilon = 0$ ,  $\sigma = 2$ ,  $\rho = 0.04$ ,  $\theta = 0.1$ ,  $\eta = 1$ ,  $\psi = 0.1$ , and we consider two different values for the production externality, namely  $\phi = 1$  (in the negative tourism externality case) and  $\phi = 0.1$  (in the positive tourism externality case). Initially, the economy lies on the BGP and thus income increases over time at a constant rate; then as the structural change occurs income increases even faster than before, both if the physical capital share rises or fall (since the sufficient conditions discussed before Proposition 2 are met).

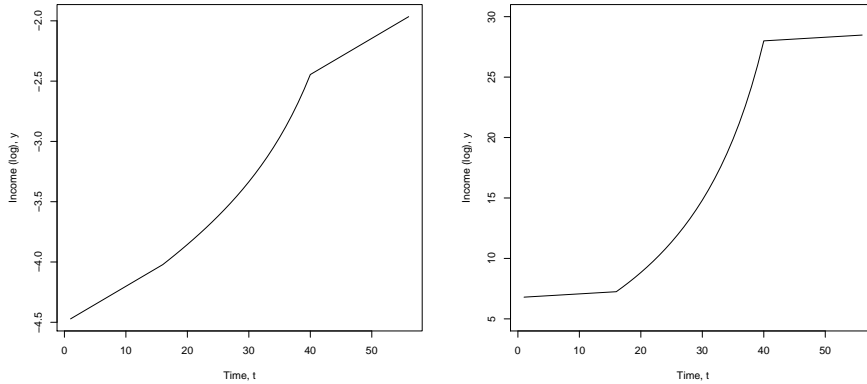


Figure 1: Evolution of income (on a logarithmic scale) arising from a sectoral shift associated with a decrease (on the left) or an increase (on the right) in the physical capital share along the BGP equilibrium. In the former case the tourism externality is negative while in the latter it is positive.

Figure 1 shows the evolution of income on a logarithmic scale, where the slope of the curve represents the growth rate of income. The figure clearly shows how the BGP equilibrium (income rising at a constant rate represented by a constant slope) is affected by the sectoral shift which leads income to rise at a faster rate (the curve becomes steeper). Once the structural change is completed and the physical capital share has been stabilized to its new level, the effect induced by structural change vanishes and a new BGP equilibrium is reached along which income grows again at its constant BGP rate (same slope as in the initial period). Note that in the case of a negative tourism externality (left panel) the increase in income growth, and thus in income, is more gradual than in the positive externality case (right panel). This is due to the fact that in the latter case structural change distorts economic activities by making output more dependent upon physical capital, which by driving transitory growth boosts a very rapid increase in income. In the former case the sectoral shift is in favor of human capital, which is the engine of long run growth but plays a minor role in determining transitory growth, such that the increase in income is smoother. Note that as soon as the structural change effect leading to a fast period of economic growth for a tourism destination is over, the economy restarts growing along a BGP along which the growth rate is driven by human capital accumulation. This means that structural change can give rise only to a temporary period of fast economic growth, as suggested by Hernandez-Martin (2008) and consistently with the pessimistic view discussed in Brau et al. (2007). Thus, once the transition induced by tourism specialization is over, a tourism economy will not show a pattern of development different from that of other non-tourism based economies. An implication of this kind of result is that tourism specialization may lead to substantial increases in living standards in the short run only<sup>6</sup>, while in the long run other strategies to promote further fast increases in income need to be pursued (i.e., advancing education and human capital formation).

Now moving to the implications of structural change on tourist flows, we wish to determine whether and under which conditions a tourist curve like that conjectured by the TALC hypothesis may be the result of a sectoral shift. Note first that along the BGP tourist flows increase and this is associated with a rising portion of the tourist curve which may represent a phase of exploration, involvement, development or consolidation. Thus, according to how  $1 - \alpha$  and  $z_t$  are related we may observe different patterns in the tourist curve. By

<sup>6</sup>The model completely abstracts from environmental depletion, which is often experienced along with tourism specialization. Thus, assessing whether such short run gains from tourism specialization may overall outweigh the environmental losses is not possible. See Marsiglio (2015) for a discussion of how tourism specialization and environmental preservation may go hand in hand.



differentiating (5) with respect to  $1 - \alpha$ , it is straightforward to obtain:

$$\frac{\partial z_t}{\partial(1 - \alpha)} = \eta \psi k_t^{\psi(1-\alpha)} \ln k_t > 0,$$

which shows that the relation between tourist flows and the physical capital share is monotonically increasing. This means that visitors keep increasing over time whenever the physical capital share rises (or does not change), while they decrease when the physical capital share falls. It is thus straightforward to state the following result.

**Proposition 3.** *Phases of exploration, involvement, development and consolidation are consistent with a BGP equilibrium. Along the BGP equilibrium structural change might alternatively generate a phase of rejuvenation, decline or stagnation, according to the direction and the size of the sectoral shift.*

Proposition 3 allows to understand how structural changes and tourist flows are related. Along the BGP, we may observe a pattern consistent with a rejuvenation situation whenever the share of physical capital increases or does not change (i.e., no structural change), while we may observe stagnation or decline whenever the share of physical capital decreases. Specifically, in the latter framework the intensity of the sectoral variation determines whether the number of tourists may stagnate (the magnitude of the variation is small) or decline (it is large). The explanation of this kind of results is straightforward: a sectoral shift directly affects the number of incoming tourists, thus whenever the share of physical capital increases and more tourists are attracted in a phase of rejuvenation will occur; whenever the share of physical capital decreases and less tourists are attracted in alternatively a phase of stagnation or decline may occur.

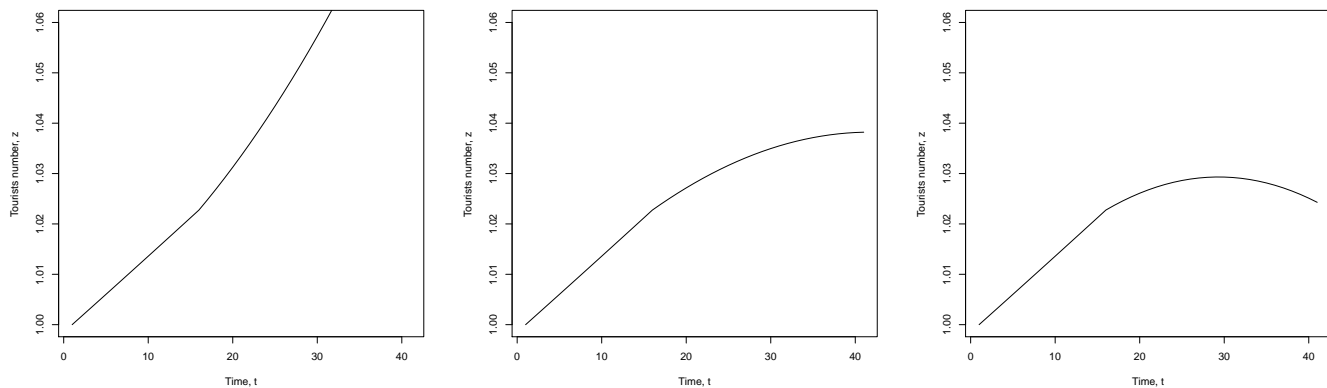


Figure 2: Tourist curves arising from a sectoral shift associated with an increase (on the left), a small reduction (in the middle) or a larger decrease (on the right) in the physical capital share along the BGP equilibrium.

In order to visualize the above result, we run another numerical simulation showing how different directions and intensities of the sectoral shift may affect the shape of the tourist curve. The parameter values are exactly the same discussed earlier with  $\phi = 1$  (negative tourism externality). Initially, the economy lies on its BGP and thus tourist flows increase over time. Then when the sectoral shift occurs, and if the physical capital share increases then the number of visitors starts increasing faster; if the physical capital share decreases then the tourist inflows remain stable if the intensity of the variation is small (just enough to offset the increase in the number of visitors induced by capital accumulation) or start decreasing if the variation is strong. Figure 2 shows that the BGP equilibrium (upward portion of the tourist curve) is affected by the sectoral shift which can induce the curve to become steeper, flat or even decreasing. Note that since along the BGP capital accumulation is always positive, once the sectoral shift occurs, the slope of the tourist

curve cannot change sign immediately, meaning that in the case of decline (since capital accumulation and sectoral shift tend to affect tourist flows in the opposite direction) there is some delay in the response of the economic and tourism relation to the sectoral shift.

Figure 2 illustrates how tourist flows may change as a result of the structural changes associated with tourism specialization. It clearly replicates the situations of rejuvenation, stagnation and decline that may occur when the number of tourists enters a ‘critical range of elements of capacity’ (Butler, 1980). Such a critical range of elements of capacity in our model is associated with tourism specialization which triggers the sectoral shift affecting the whole productive side of the economy. Thus, our approach here differently from Butler’s (1980) does not focus on any aspect of carrying capacity<sup>7</sup> but it simply analyzes the relationship between tourism specialization, economic growth, structural change and tourist flows. Even without specifically considering environmental (and even social) constraints, structural change along the BGP equilibrium may give rise to different phases consistent with those conjectured by the TALC hypothesis. As discussed earlier for what concerns income (even if not shown in the figure), note that structural change gives rise to a transition affecting the economy and tourist inflows till a new BGP equilibrium is reached. Thus, the phases of rejuvenation, stagnation and decline that may arise with the structural change represent only transitional effects which will tend to disappear in the long run as soon as the structural change is completed and the economy has reached a new BGP equilibrium along which tourist flows grow at a constant positive rate, as in (7).

## 4 Economic vs Tourism Performance

A careful analysis of Propositions 2 and 3 highlights the fact that, in our setting, tourism specialization by giving rise to a structural change shifting economic production from one sector to the other may lead to break down the otherwise generally positive relationship between economic performance and tourism performance (i.e., number of visitors). Indeed, it may happen that the sectoral shift generates a simultaneous increase in economic performance and reduction in tourism performance. Specifically, along the BGP, a decrease in the physical capital share (i.e., a fall in  $1 - \alpha$ ) may lead to a reduction in the number of visitors and an increase in residents’ income either if the tourism externality is negative (that is  $\phi > \alpha$ ) or positive (that is  $\phi < \alpha$ , whenever the condition  $\ln(\frac{r}{1-\alpha}) > \frac{(1+\phi-\alpha)(\alpha-\phi)}{1-\alpha} + \phi \ln \bar{u}$  holds). This might allow to de-link the dependence of the destination from tourism related activities, promoting a new phase of economic development for the tourism destination. This allows us to state the following result about the relationship between economic and tourism performance in tourism-based economies.

**Proposition 4.** *Along the BGP, structural change may give rise to a hump-shaped relationship between income and number of visitors in tourism destinations. This might occur whenever tourism specialization leads to a decrease in the physical capital share.*

Proposition 4 shows that tourist flows and residents’ income do not necessarily move in the same direction in a response to structural change. In particular, it may well be the case that structural change leads to a reduction in the number of tourists (consistent with a decline situation according to the TALC) and a simultaneous increase in residents’ income. Thus, in such a framework a decline in tourism does not have to be interpreted as a poor outcome for the tourism destination since it may be associated with income growth. Such an outcome might occur independently of the type of tourism-induced production externality. In order to illustrate the outcome suggested by Proposition 4 we propose a numerical simulation, based on the same parameter values employed earlier (with  $\phi = 1$ ). Consistently with what just discussed, Figure 3 shows a bell-shaped relationship between tourists number and residents’ income in the number of tourists and income plane.

<sup>7</sup>See Marsiglio (2017) for a discussion of the relation between optimal tourist numbers and carrying capacity in tourism destinations.

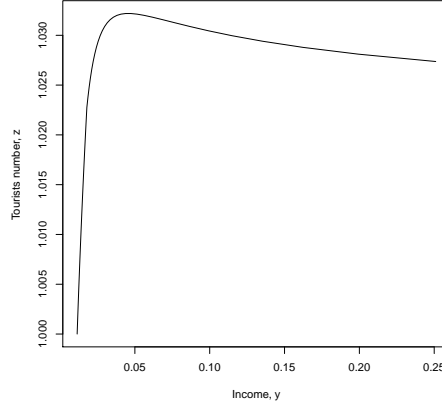


Figure 3: Bell-shaped income-visitors relation arising from a sectoral shift associated with a reduction in the physical capital share along the BGP equilibrium.

The eventual existence of such an inverted-U income-visitors relation requires us to reconsider completely the nature of the mutual interactions between tourist arrivals and economic development in tourism destinations. Indeed, policymakers may obtain increases in income for the resident population even without implementing policies aiming at attracting larger and larger numbers of tourists. Thus, it might be possible de-linking economic development from tourism specialization and tourism dependence, meaning that while in earlier phases of economic development tourism might be the tool to achieve an economic take off, in later stages it might be possible to rely on other strategies in order to ensure that the growth process continues smoothly<sup>8</sup>. Again, as discussed in the previous section this kind of result may only represent a temporary outcome since as soon as the structural change is completed the economy restarts growing along a BGP equilibrium characterized by increases in income and in tourist flows. However, despite the temporary nature of the results we believe this type of outcome may require policymakers in tourism destinations to review their approach towards economic development. Indeed, in developing countries largely relying on tourism activities policymakers often see tourism specialization as the only tool to achieve economic growth (Crusol et al., 1989). While this might be true in an earlier phase of economic development, it does not necessarily have to be also later.

This result highlights the importance of policymakers in planning the development process in tourism destinations. Approaching the development problem with a myopic view on the dynamic effects of tourism specialization on income growth is not beneficial for the resident population. The panacea effect associated with tourism often invoked by policymakers (Commonwealth Secretariat and World Bank, 2000) could be over after a certain income level has been achieved and this does not need to be interpreted as a threat for future development prospects but rather as an opportunity. The negative effects induced on the hosting economy by tourist activities have been widely documented, and they include additional pressure on the environment, erosion of cultural sites, sociocultural effects, infrastructure and attraction congestion (Dwyer and Forsyth, 1997). Therefore, the possibility to de-link economic growth from tourism specialization needs to be considered with an open mind and eventually embraced to effectively take the leap required to move from the initial take off to the next phase of economic consolidation. This might require to stop emphasizing

<sup>8</sup>Note however that since (resident) households do not receive utility only from consumption, understanding the effects of a reduction in tourists number on welfare is more complex. Indeed, a crucial role in this framework is played by the weight attached to visitors in households' preferences (Marsiglio, 2016). Specifically, as long as  $\epsilon \leq 0$  a fall in tourism will undoubtedly generate increases in welfare, while if  $\epsilon > 0$  it might even be that the reduction in tourist flows more than offsets the increase in consumption associated with economic growth leading overall welfare to drop.

the importance of pro-tourism and pro-tourists policies, but rather to focus economic policy on the needs of the local population. For example, introducing policies targeted to incentivize physical and human capital accumulation (like incentives towards saving and education subsidies) or to promote technological progress through imitation or innovation (like research subsidies or incentives for establishing joint ventures) might be an important step to effectively move into a new era characterized by more traditional industries and activities. Clearly such a radical change cannot occur overnight and it would necessarily require some decades before the conversion from tourism to more traditional sectors is completed, thus the role of policymakers is crucial to support and promote the change during such a transitional period (Darrow, 1995). Carefully planning an effective “exit strategy” from tourism specialization, even if particularly complicated from political, social and economic points of view, may be the necessary step to allow the economy to move towards its next phase of economic development (Baum, 1998).

## 5 Discussion

We have analyzed a specific two-sectors model of endogenous growth to understand how structural change might affect economic and tourism performance in a tourism destination. We have shown that structural change might explain why tourism economies may experience fast economic growth as suggested by empirical evidence, and why phases of rejuvenation, decline or stagnation consistent with the predictions of the TALC hypothesis might occur. These two results jointly suggest that structural change may also lead to de-link economic growth from tourism dependence, giving rise to a new phase of economic development for the tourism-based economy. Such theoretical conclusions are clearly appealing from a policymaking point of view, but require us to carefully reason which specific assumptions our model is built on and thus in which specific contexts such conclusions may apply.

Our model is best suited to describe the development experience of countries highly specialized in tourism, meaning those economies in which tourism accounts for a substantial share of GDP. In particular small island countries, in which tourism is to a largest extent driven by international tourists and which because of their remote location tend to interact with other worldwide economies only marginally, are best represented by the model. Indeed, these are exactly those tourism-based economies which have been shown to experience high rates of economic growth (Lanza et al., 2003; Brau et al., 2007) and also those economies in which structural change may occur more strongly as a result of tourism development (Hernandez-Martin, 2008; WTTC, 2013). These are also the countries in which tourism is more often seen by policymakers as the unique available development strategy (Wilkinson, 1989; Crusol et al., 1989), since characterized by the “luxury of limited choice” (Persaud, 2011), and thus they are those countries in which an eventual de-link of growth from tourism may affect the planning of (sustainable) economic development more strongly. The tourism literature has traditionally been particularly interested in analyzing the experience of small island countries because the peculiarities of these economies allow to assess more clearly than in others the impacts of tourism specialization on the hosting community, from economic, environmental and social points of view (see, among others, De Albuquerque and McElroy, 1992; Croes, 2006; Giannoni and Maupertuis, 2007). Developing thus a simple model allowing to characterize the experience of this particular type of tourism-based economies seems a sensible starting point to analyze the effects of tourism development.

Most of our model’s assumptions are almost standard in the economics literature to develop a tractable model of economic growth (Barro and Sala-i-Martin, 2004). However, some of them, and in particular those related to the role of physical capital, human capital and technological progress, deserve some specific comments when used to characterize tourism specialization and tourist flows. Physical capital in our model is meant as a form of tourism and natural capital, representing thus the stock of tourism facilities and natural amenities which at the same time play a productive role and are a determinant of the attractiveness of a tourism destination (Cerina, 2007); the limited ability to rely on physical capital accumulation to increase output, embedded in the diminishing returns assumption, implies that tourism and natural capital can be

only a transitory source of economic growth, and in order to achieve sustained increases in output and income levels it is essential to rely on human capital. Human capital in this framework can be interpreted not only in the strict sense (education and training) but also in a broader sense encompassing also culture or social capital; in our baseline model we have assumed that such a broader notion of human capital does not affect in any way tourist flows, which is clearly not consistent with the idea that culture and social factors of specific destinations are important drivers of tourism (Mayo and Jarvis, 1981; Silberberg, 1995); despite such an apparent inconsistency in our model’s specification, it is possible to show (see appendix C) that even extending the analysis along this direction would not change our qualitative results, and thus it seems convenient to present them first in the simplest possible form. Technological progress in our model is assumed to reflect the relative abundance of physical and human capital in order to further stress the impact of structural change on the evolution of income and tourist flows in a tourism destination; realistically, it is assumed to be not a direct driver of tourism but to impact tourist flows only indirectly through the relative composition of production activities.

Overall, we believe that in its simplicity, our model is able to capture in a very intuitive way some of the most important channels through which tourism specialization may affect the development experience of small island countries. The main message from our analysis is that in such countries the importance of tourism in planning economic development might change over time, and while tourism may be the only viable strategy to promote economic growth in earlier phases of economic development, in later stages (according to how structural change may affect tourist flows) it does not necessarily need to be. This suggests that the role of policymakers in such countries is not simple at all since there may even be some conflict between the needs to promote sustainable tourism and sustainable development, which do not necessarily need to go hand in hand (Hunter, 1995; Sharpley, 2000). By following Persaud’s (2011) argument, a luxury of limited choice may be in place only in earlier stages of economic development but not in later phases, when eventually the array of potential choices might become substantially wider and might require to carefully strategize the entire process of economic development.

## 6 Conclusion

This paper analyzes the relationship between tourism specialization and structural change, and its implications for both economic and tourism performance from a theoretical perspective. The structural changes associated with tourism development are well documented in literature and understanding how they might affect the economy of a tourism destination is an important step in order to improve the policy making process. We develop a stylized two-sector model of endogenous growth in which tourism specialization plays two fundamental roles: on the one hand, it generates a production externality, and on the other hand, gives rise to a sectoral shift. Both the production externality and the sectoral shift affect the productive side of the economy making economic production more or less dependent upon the two production factors, physical and human capital. Such a stylized model allows to explain why tourism specialization may lead to a temporary period of fast economic growth (as highlighted by the empirical literature on tourism destinations) and why it may also lead alternatively to phases of rejuvenation, stagnation or decline (consistently with the predictions of the TALC hypothesis). These results suggest that the structural change associated with tourism specialization might play a very important role in shaping the development pattern of a tourism destination, thus this issue which has been barely analyzed thus far should deserve greater attention. Moreover, our results also suggest a new view on the nature of the tourism and economy relationship. Indeed, whenever tourism specialization leads to a sectoral shift reducing the share of physical capital (i.e., tourism and natural capital) it may lead to an inverted-U income-visitors relation; this implies that (residents’) income might increase even if the number of visitors falls over time, and such a possibility requires us to reinterpret the dependence of economic performance from tourism activities.

Note that our results have been obtained by relying on a quite simplistic approach to model tourism

specialization and structural change. In order to develop a more realistic framework the channels through which tourism specialization generates a structural change should be explained, thus to some extent structural change should be endogenously determined as a result of tourism specialization. Also the approach used to explain why a tourist curve consistent with the TALC hypothesis may arise is overly simple, since we are able to characterize only how structural change may generate curves whose slopes have signs consistent with those hypothesized. A deeper explanation based upon some microfoundation of how and why the evolution of the number of tourists may show a pattern similar to that advanced by the TALC is needed in order to understand the factors underlying later stages of rejuvenation, stagnation and decline. The eventual existence of a bell-shaped tourism and income relationship also deserves further analysis, both from a theoretical point of view in order to better understand under which more general conditions it might occur as a result of tourism specialization, and from an empirical point of view in order to assess whether in reality we can already observe such a de-link between tourism specialization and economic growth in specific economies. These issues are left for future research.

## A BGP Equilibrium

The optimization problem in section 2 leads to the following Euler equations for consumption and share of human capital employed in final production:

$$\frac{\dot{c}_t}{c_t} = \frac{1}{\sigma} \left[ \alpha k_t^{\alpha-1-\phi} h_t^{1-\alpha+\phi} u_t^{1-\alpha} - \rho \right] \quad (9)$$

$$\frac{\dot{u}_t}{u_t} = \frac{1}{\alpha} \left[ \theta(1-\alpha+\phi) - \theta(\phi-\alpha)u_t - \phi k_t^{\alpha-1-\phi} h_t^{1-\alpha+\phi} u_t^{1-\alpha} - (\alpha-\phi) \frac{c_t}{k_t} \right] \quad (10)$$

Since the economy shows long-run growth, the system of differential equations defined by (9), (10), (2) and (3) does not show any stationary equilibrium. By introducing the variables  $\chi_t = \frac{c_t}{k_t}$  and  $\varphi_t = k_t^{\alpha-1-\phi} h_t^{1-\alpha+\phi} u_t^{1-\alpha}$  it is possible to recast it in a stationary system of three differential equations:

$$\begin{aligned} \frac{\dot{\chi}_t}{\chi_t} &= \chi_t - \frac{\rho}{\sigma} - \frac{\sigma-\alpha}{\sigma} \varphi_t \\ \frac{\dot{\varphi}_t}{\varphi_t} &= \frac{1-\alpha+\phi}{\alpha} \theta - \frac{\phi}{\alpha} \theta u_t - \frac{\alpha(1-\alpha)+\phi}{\alpha} \varphi_t + \frac{\phi}{\alpha} \chi_t \\ \frac{\dot{u}_t}{u_t} &= \frac{1}{\alpha} [\theta(1-\alpha+\phi) - (\phi-\alpha)\theta u_t - \phi \varphi_t + (\phi-\alpha)\chi_t]. \end{aligned}$$

The steady state of the system, found by setting the previous equations equal to zero, is given by  $(\bar{\chi}, \bar{\varphi}, \bar{u})$  where:  $\bar{\chi} = \frac{\theta(\sigma-\alpha)+\alpha\rho}{\alpha\sigma}$ ,  $\bar{\varphi} = \frac{\theta}{\alpha}$ ,  $\bar{u} = \frac{\theta(\sigma-1)+\rho}{\theta\sigma}$ . Provided that  $\sigma > 1$  as suggested by empirical evidence, a sufficient condition for  $(\bar{\chi}, \bar{\varphi}, \bar{u})$  to be well defined is  $\theta > \rho$ . Plugging the equilibrium value of  $(\bar{\chi}, \bar{\varphi}, \bar{u})$  in (9) yields the economic growth rate, common to all economic variables; the growth rate of tourist inflows is instead straightforward by log-differentiating (5) with respect to time. Note that as long as  $\theta > \rho$  both the economic and tourism growth rate are strictly positive.

In order to study the transitional dynamics of the system, we can proceed via linearization, obtaining the Jacobian matrix, which evaluated at steady state reads as:

$$J(\bar{\chi}, \bar{\varphi}, \bar{z}) = \begin{bmatrix} \bar{\chi} & -\frac{\sigma-\alpha}{\sigma} a \bar{\chi} & 0 \\ \frac{\phi}{\alpha} \bar{\varphi} & -\frac{\alpha(1-\alpha)+\phi}{\alpha} \bar{\varphi} & -\frac{\phi}{\alpha} \theta \bar{\varphi} \\ \frac{\phi\alpha}{\alpha} \bar{u} & -\frac{\phi}{\alpha} \bar{u} & -\frac{\phi-\alpha}{\alpha} \theta \bar{u} \end{bmatrix}.$$

It is straightforward to show that its determinant (representing the product of the three eigenvalues) is given by  $\det J(\bar{\chi}, \bar{\varphi}, \bar{z}) = -\bar{\chi}\bar{\varphi}\theta\bar{u}(1-\alpha+\phi)$ ; this is negative whenever  $\phi > 0$  or also whenever  $\phi < 0$ , provided that  $|\phi|$  is not too large. A negative determinant implies that at least one eigenvalue is negative, suggesting that the BGP equilibrium is at least saddle-point stable.

## B Income and Structural Change

Along the BGP, it is possible to derive the following expression:  $k_t = \left(\frac{r}{1-\alpha}\right)^{\frac{1}{\phi-\alpha}} \bar{u}^{-\frac{\alpha}{\phi-\alpha}} h_t$ , which plugged into the expression for income yields:  $y_t = \bar{u}^{-\frac{\alpha}{\phi-\alpha}} \left(\frac{r}{1-\alpha}\right)^{\frac{1+\phi-\alpha}{\phi-\alpha}} h_t$ , where  $r \equiv \frac{\theta\sigma-\varphi\rho}{\sigma-\varphi}$ . By differentiating with respect to  $1-\alpha$  this last expression we obtain:

$$\frac{\partial y_t}{\partial(1-\alpha)} = h_t \left(\frac{r}{1-\alpha}\right)^{\frac{1+\phi-\alpha}{\phi-\alpha}} \bar{u}^{-\frac{\alpha}{\phi-\alpha}} \left[ \frac{\phi \ln \bar{u}}{\phi-\alpha} - \frac{1}{\phi-\alpha} \ln \left(\frac{r}{1-\alpha}\right) - \frac{1+\phi-\alpha}{1-\alpha} \right].$$

Note that  $\ln \bar{u} < 0$  since  $\bar{u} \in (0, 1)$ , while  $\ln\left(\frac{r}{1-\alpha}\right) > 0$  since  $r > 1$  (due to the fact that  $\theta > \rho$ ). Therefore, whenever  $\phi > \alpha$ , the above expression is negative, since the term outside the square brackets is positive while that inside the brackets is negative. Whenever  $\phi < \alpha$ , the above expression has an ambiguous sign, since the term outside the square brackets is negative while that inside is ambiguous. However, it is possible to determine a sufficient condition for the derivative to be unambiguously determined. Indeed, whenever  $\ln\left(\frac{r}{1-\alpha}\right) > \frac{(1+\phi-\alpha)(\alpha-\phi)}{1-\alpha} + \phi \ln \bar{u}$ , the term in the square brackets is negative and thus the derivative is positive, while whenever  $\ln\left(\frac{r}{1-\alpha}\right) < \frac{(1+\phi-\alpha)(\alpha-\phi)}{1-\alpha} + \phi \ln \bar{u}$ , this term is positive and thus the derivative is negative, provided that the RHS in this last inequality is positive. For this to be the case we need that the following condition  $\phi \in (\Lambda_1, \Lambda_2)$  holds true, where  $\Lambda_1 = \frac{1}{2}[\omega - \sqrt{\omega + 4\varepsilon}]$  and  $\Lambda_2 = \frac{1}{2}[\omega + \sqrt{\omega + 4\varepsilon}]$  with  $\omega = (2\alpha - 1) + (1 - \alpha) \ln \bar{u}$  and  $\varepsilon = \alpha(1 - \alpha)$ . Thus, the income and physical capital share relation strictly depends on the relative size of  $\phi$  and  $\alpha$ , as summarized in Proposition 2.

## C Human Capital as a Determinant of Tourist Flows

Thus far we have assumed that tourists are attracted in the tourism destination by the stock of physical capital (i.e., tourism and natural capital). We now assume that tourist flows depend not only on physical capital but also on human capital, and such an assumption is relevant whenever human capital is considered to encompass also cultural and social capital, since, as several studies discuss, tourism in several circumstances is at least partly driven by cultural and social factors (Mayo and Jarvis, 1981; Silberberg, 1995). The flow of tourists in the tourism economy is now given by the following expression:

$$z_t = \eta(u_t h_t)^{\psi_1 \alpha} k_t^{\psi_2 (1-\alpha)}, \quad (11)$$

where  $\psi_1, \psi_2 > 0$  and  $\psi_1 \leq \psi_2$ , reflecting the resource-use intensity in the tourism destination. Intuitively, the latter parametric condition states that physical capital, which remember includes both tourism capital and natural capital, is the most important determinant in tourist preferences. With such a new formulation of tourist flows, it is straightforward to show that all our main conclusions still hold true. Indeed, the economic growth rate and the share of human capital devoted to output production are still equal to (6) and (8), respectively; the fact that the economic growth rate is unaffected by the introduction of such a new assumption suggests that our conclusions in Proposition 2 still apply. The growth rate of tourist flows along the BGP is now given by the following expression  $\gamma_z = [\psi_1 \alpha + \psi_2 (1 - \alpha)] \gamma > 0$ , which is strictly positive. By differentiating (11) with respect to  $1 - \alpha$ , we can note that the tourist flows and physical capital share relation is monotonically increasing provided that  $\psi_2 > \frac{\psi_1 \ln x_t}{\ln k_t}$ , or equivalently:

$$\psi_2 > \psi_1 \left[ 1 + \frac{\ln\left(\frac{1-\alpha}{r}\right) + \phi \ln \bar{u}}{(\phi - \alpha) \ln k_t} \right]. \quad (12)$$

Recall that we have assumed that  $\psi_2 \geq \psi_1$ . Therefore, whenever  $\phi > \alpha$  the relationship between tourist flows and the physical capital share is positive, since the second term in the square brackets is negative (due to the fact that  $\ln \bar{u} < 0$  and, since  $r > 1$ , also  $\ln\left(\frac{1-\alpha}{r}\right) < 0$ ). Whenever instead  $\phi < \alpha$ , the relationship between

tourist flows and the physical capital share is positive, provided that the second term in the square brackets is negative, which requires that  $\phi$  is negative and smaller than a certain value  $\phi < -\frac{\ln(\frac{1-\alpha}{r})}{\ln \bar{u}}$ . Therefore, under some additional parameter condition, the relationship between tourist flows and the physical capital share is monotonically increasing; this suggests thus that our conclusions in Proposition 3 still hold true. Since both Proposition 2 and Proposition 3 still apply, then it is straightforward to conclude that exactly the same results in Proposition 4 hold (eventually under some additional condition). This allows us to conclude that from a qualitative point of view all the results that we have presented in the body text apply also in more complicated and realistic setups.

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