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Economics of tourism & growth for small island countries

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HIGHLIGHTS

- A model of tourism and economic growth model is developed.
- Impact of income change in source countries on destination is examined.
- Price elasticity of demand, income elasticity of tourist, and degree of competition in service sector are analysed.
- Modelling presented provides a good framework for applied economic research.

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ABSTRACT

We theoretically analyze the impact of changes in foreign income from tourism source countries on the growth of tourism dependent small island economies. Using a general theoretical construct, we attempt to answer the question of how price elasticity of demand, income elasticity of tourist and the degree of competition in the service sector influence the economic development of small economies. One of the main results is that politicians may consider applying policies which lead to a competitive environment in the service sector to maximize growth and the consequent labor income share.

1. Introduction

Noting the huge impact of tourism at a global level, we develop an economic growth model for small island countries whose economy depends largely on international tourism. Taking into account the contribution of tourism on GDP from the World Travel & Tourism Council (http://www.wttc.org/datagateway/) in 2013, countries which show high dependency of tourism include Seychelles (58%), Anguilla (59%), Antigua and Barbuda (60%), Aruba (85%), Barbados (36%), Cook Islands (49%) former Dutch Antilles (48%), St. Lucia (37%), British Virgin Islands (85%), Fiji (38%), Macau (95%), Maldives (78%), and Vanuatu (51%).

The existing literature (Brida, London, & Rojas, 2013; Chao, Hazari, Laffargue, Sgrò, & Yu, 2006, 2008, Chao, Hazari, and Yu, 2010; Schubert & Brida, 2008) pays little attention to small islands' specific factors such as the limited amount of land or a non-perfectly competitive market structure of the tourism industry, which our model attempts to overcome.

The intuition is that a composite tourism good is produced by hotels which operate in a monopolistic competition and make use of land and different services. Except the model of Hazari and Sgrò (1995), which assume a monopoly, all other papers assume perfect competition.

2. The model

Similar to Schubert, Brida, and Risso (2011), the demand function $X^{T,D}$ for the composite tourism good X^T, consisting of all goods and services consumed by tourists, is given by:

$$X^{T,D} = \left(p^T\right)^{-\eta}\left(Y^F\right)^{\phi}, \tag{1}$$

where Y^F represents the tourists' aggregate real income, p^T the

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tourism good's price, and we assume a fixed exchange rate. The exponents η and ϕ represent the absolute value of the price elasticity and the income elasticity, respectively. From the literature (see Song, Dwyer, Li, & Cao, 2012; Brida & Pulina, 2010) we can derive, that mostly $\phi > 1 > -\eta > 0$ hold. Omitting the consumption side of the island economy, we make the simplifying assumptions that: all land is residentially owned and that the number of workers N is given; each worker lives for one period, gets one off-spring, and supplies her labor inelastically. The tour operators sell the tourism good in a perfectly competitive market where the composite tourism good is produced by fixed amount land L^T and tourist services provided by m hotels. Typically, hotel services are not homogenous. Hence, the market structure of the hotel sector can be described as monopolistically competitive. Using the Dixit-Stiglitz approach (Dixit & Stiglitz, 1977; Ethier, 1982; Romer, 1989, 1990), we define s_i as the quantity of hotel services offered by hotel i and consider the aggregate production of the tourism good $X^{T,S}$ as:

$$X^{T,S} = A\left(L^T\right)^{\beta} \sum_{i=1}^{m} s_i^{1-\beta}, \tag{2}$$

where $A > 0$, and $1 > \beta > 0$. Tour operators operate under perfect competition and thus the factor prices p_i of the service goods and p_{L^T} the rental price for a piece of land is treated as given. A representative tour operator maximizes profits:

$$\max_{L^T, s_1, \ldots, s_m} p^T A\left(L^T\right)^{\beta} \sum_{i=1}^{m} s_i^{1-\beta} - p_{L^T} L^T - \sum_{i=1}^{m} p_i s_i \tag{3}$$

The resulting $m+1$ first order conditions are:

$$\beta p^T A\left(L^T\right)^{\beta-1} \sum_{i=1}^{m} s_i^{1-\beta} - p_{L^T} = 0 \tag{4}$$

$$(1-\beta) p^T A\left(L^T\right)^{\beta} s_i^{-\beta} - p_i = 0, \quad \forall i = 1,,m \tag{5}$$

From (5) we derive the price functions for all m services:

$$p_i(s_i) = (1-\beta) p^T A\left(L^T\right)^{\beta} s_i^{-\beta}, \ \forall i = 1,,m \tag{6}$$

The hotels are confronted with labor costs, fixed costs M and an internationally given interest factor R. The fixed cost reflects all costs to set up the hotel i and its quantity of services depends on the labor input n_i. Assuming $s_i = n_i$, the unit labor requirement is one and the competitive wage rate equals w. The more similar the hotel services the lower is the elasticity of substitution regarding the different hotels.

Each hotel solves the maximization problem:

$$\max_{s_i} p_i(s_i) s_i - w n_i - RM \tag{7}$$

Assuming that all hotels are symmetric and a perfectly competitive labor market, we derive $n_i = \frac{N}{m}$. Solving the FOC for the wage rate, we get:

$$w = (1-\beta)^2 p^T A m^{\beta} N^{-\beta} \left(L^T\right)^{\beta} \tag{8}$$

Using equations (2)–(6) and (8) we get the short-run and the long-run equilibrium values. In the short-run m is constant and we get:

$$p^T = \left(Y^F\right)^{\frac{\phi}{\eta}} \left(A\left(L^T\right)^{\beta} N^{1-\beta} m^{\beta}\right)^{-\frac{1}{\eta}}. \tag{9}$$

$$w = (1-\beta)^2 \left(Y^F\right)^{\frac{\phi}{\eta}} (A)^{\frac{\eta-1}{\eta}} N^{-\frac{(1-\beta(1-\eta))}{\eta}} \left(L^T m\right)^{\frac{\beta(\eta-1)}{\eta}}. \tag{10}$$

$$\Pi_S = (1-\beta)\beta \left(Y^F\right)^{\frac{\phi}{\eta}} N^{-\frac{(\eta-1)(1-\beta)}{\eta}} m^{\frac{\beta(\eta-1)-\eta}{\eta}} (A)^{\frac{\eta-1}{\eta}} \left(L^T\right)^{\frac{\beta(\eta-1)}{\eta}}. \tag{11}$$

The international capital market requires that the gross margin of the representative hotel divided by its fixed costs is equal to the international capital market interest factor:

$$\frac{(1-\beta)\beta \left(Y^F\right)^{\frac{\phi}{\eta}} N^{\frac{(\eta-1)(1-\beta)}{\eta}} m^{\frac{\beta(\eta-1)-\eta}{\eta}} (A)^{\frac{\eta-1}{\eta}} \left(L^T\right)^{\frac{\beta(\eta-1)}{\eta}}}{M} = R. \tag{12}$$

Equation (12) delivers the optimal m^*:

$$m^* = \left[\left(\frac{(1-\beta)\beta}{RM}\right)^{\eta} N^{(\eta-1)(1-\beta)} (A)^{\eta-1} \left(L^T\right)^{\beta(\eta-1)} \left(Y^F\right)^{\phi}\right]^{\frac{1}{\beta(1-\eta)+\eta}}. \tag{13}$$

where the exponent $\frac{1}{\beta(1-\eta)+\eta} > 0$. Using (13) and (9)–(12) we get the following long-run equilibrium values:

$$w^* = \left[\frac{(1-\beta)^{(2\eta+\beta(1-\eta))} (A)^{n-1} \left(\frac{\beta L^T}{RM}\right)^{\beta(\eta-1)} \left(Y^F\right)^{\phi}}{N}\right]^{\frac{1}{\beta(1-\eta)+\eta}}. \tag{14}$$

$$p^* = \left[\frac{(1-\beta)^{\eta} (A)^{n-1} \left(\frac{\beta L^T}{RM}\right)^{\beta(\eta-1)} \left(Y^F\right)^{\phi}}{N}\right]^{\frac{1}{\beta(1-\eta)+\eta}} \tag{15}$$

$$s^* = n^* = \left[\frac{N(A)^{1-n} \left(L^T\right)^{\beta(1-\eta)} \left(\frac{RM}{\beta(1-\beta)}\right)^{\eta}}{(1-\beta)^{\eta} \left(Y^F\right)^{\phi}}\right]^{\frac{1}{\beta(1-\eta)+\eta}}. \tag{16}$$

$$p^{T*} = \left[\frac{(RM)^{\beta} \left(Y^F\right)^{\phi(1-\beta)}}{N^{1-\beta} A\left((1-\beta)\beta L^T\right)^{\beta}}\right]^{\frac{1}{\beta(1-\eta)+\eta}} \tag{17}$$

$$p_{L^T}^* = \left[\beta^{\eta} L^{T^{(2\beta(\eta-1)-\eta)}} (A)^{n-1} \left(\frac{(1-\beta)}{RM}\right)^{\beta(\eta-1)} N^{(1-\beta)(\eta-1)} \left(Y^F\right)^{\phi}\right]^{\frac{1}{\beta(1-\eta)+\eta}} \tag{18}$$

$$X^{T*} = \left[(A)^{n} \left(\frac{(1-\beta)\beta L^T}{RM}\right)^{\beta\eta} N^{(1-\beta)\eta} \left(Y^F\right)^{\phi\beta}\right]^{\frac{1}{\beta(1-\eta)+\eta}}. \tag{19}$$

Multiplying the RHS of (18) with the RHS of (19), the GDP in foreign currency becomes:

$$Y^* = p^{T*} X^{T*} = \left[(A)^{n-1} \left(\frac{(1-\beta)\beta L^T}{RM}\right)^{\beta(\eta-1)} N^{(1-\beta)(\eta-1)} \left(Y^F\right)^{\phi}\right]^{\frac{1}{\beta(1-\eta)+\eta}} \tag{20}$$

The GDP is split into three constant shares of incomes: the labor income share $(1-\beta)^2$, the land rent share β, and the capital income