共同利用・共同研究拠点 Joint Usage/Research Center
東京大学 The University of Tokyo
空間情報科学研究センター
Center for Spatial Information Science

Discussion Paper Series

No. **160**

CSIS Discussion Paper

November 2019

Battles between residents and tourists:
On the welfare effects of growing tourism

Takaaki Takahashi
(Center for Spatial Information Science, The University of Tokyo)

Battles between residents and tourists:

On the welfare effects of growing tourism

Takaaki Takahashi

Center for Spatial Information Science,
The University of Tokyo.
5-1-5, Kashiwa-no-ha, Kashiwa, Chiba 277-8568, Japan

November 2019

Abstract

This paper examines the impacts of the rise in international tourism on the welfare of local residents. In addition to the positive effect to raise wage, it has two negative effects, namely, the effect to replace the production of the varieties for consumption of local residents by the production of the varieties for consumption of tourists, and the effect to raise input price, which in turn enhances output price as well. By constructing a simple model, we show that growing tourism can hurt a worker in the home country when the negative variety shifting effect and price effect outweigh the positive wage effect.

Keywords: rise in tourism; tourist cost; variety shifting effect

JEL Classification Numbers: F1; R1; Z3

E-mail address: takaaki-t@csis.u-tokyo.ac.jp

I appreciate the comments from seminar participants at various institutions. This research is partly supported by the Grants in Aid for Research by the Ministry of Education, Science and Culture in Japan (No. 18H00841).

1 Introduction

In recent years, world economy has seen a rapid expansion of international tourism, which is a result of the economic growth, particularly in developing economies, combined with the decreases in transport costs due to the prevalence of less expensive airline services by LCC's and in accommodation costs due to the spread of shared houses after the launch of Airbnb. For example, Table 1 shows that the number of total international arrivals was steadily increasing from 1995 to 2017, and more than doubled in that period, both in the whole world and in the high income countries (HIC's). Furthermore, not only the volume but also the value shows a similar trend: the receipts from the international tourism grew approximately threefold in the same period. For most of the time intervals, furthermore, the receipts increased more rapidly than GDP, and thus, the ratio of the total receipts to the total GDP rose both in the whole world and in the HIC's. Indeed, in the HIC's, the ratio grew about 1.4 times in the 12 years.

Table 1: Changes in international tourism

	samples	1995	2000	2005	2010	2015	2017
total arrivals[a]	world	523.91	677.39	808.77	956.37	1206.22	1341.46
(million persons and relative		1	1.29	1.54	1.83	2.3	2.56
size to the figure in 1995)	HIC	378.85	472.27	519.15	574.2	33.06	814.74
		1	1.25	1.37	1.52	1.93	2.15
total receipts[a]	world	484.9	570.99	816.99	1098.73	1402.81	1525.68
(billion US$ and relative		1	1.18	1.68	2.27	2.89	3.15
size to the figure in 1995)	HIC	401.49	458.49	616.84	789.69	1021.58	1109.36
		1	1.14	1.54	1.97	2.54	2.76
ratio of total receipts	world	1.57	1.7	1.72	1.66	1.87	1.89
to total GDP[b]		1	1.08	1.1	1.06	1.19	1.2
(% and relative size to	HIC	1.55	1.66	1.64	1.74	2.13	2.17
the figure in 1995)		1	1.07	1.06	1.12	1.37	1.4
average ratio of receipts to GDP[c] (%)	OECD	-	-	-	3.12	3.14	3.24

[a] Source: World Tourism Organization, *Yearbook of Tourism Statistics* and *Compendium of Tourism Statistics*.
[b] Source: Computed by the author from the data in World Tourism Organization, *Yearbook of Tourism Statistics* and *Compendium of Tourism Statistics*; and World Bank national accounts data.
[c] Source: Computed by the author from the data at OECD.stat.

As a result of such expansion, tourism now occupies a non-negligible part of economic activities. For one thing, the last row in Table 1 shows that the average ratio of the tourism receipts to GDP in each 36 OECD country reaches more than 3%. Furthermore, Faber and Gaubert (2018) reaffirm through a rigorous econometric analysis that tourism has strong positive effects on local employment, local population, local GDP and wages.

Despite the importance of tourism, however, the impacts of a rise in tourism on the welfare of residents have been seldom studied. Notable exceptions are the works by Copeland (1991), Chao et al. (2006) and Lanzara and Minerva (2018), which examine the impacts of growing tourism, focusing on the impacts brought about by a change in terms of trade. In those works, international tourism is interpreted as "export" of non-tradable goods and services from a home country to foreign countries. Then, as a result of the upsurge of international tourists, the price of home country's "export" rises relatively to that of its import, which means that the terms of trade of the home country improves. The improvement of terms of trade, as is well known in the international trade theory, makes home country consumers better off.

Having said that, the above line of research is not entirely satisfactory in two points. First, although the change in terms of trade is certainly an important factor, there are other channels through which rising tourism affects the welfare of local residents. One of the most important is a change in the composition of varieties. Because of the difference in preference, tourists consume "tourism varieties," which home country consumers do not consume. As a result of the rise in tourism, the demand for tourism varieties increases more than the varieties consumed by local residents. If the amounts of inputs necessary for the production of varieties are limited in the home country, therefore, the range of the varieties offered to local residents shrinks, which has an adverse effect on their welfare. We refer to this negative effect as a *variety shifting effect*. Second, the effect of a change in terms of trade consists of two sub-effects; and it is often more instructive to analyze those sub-effects than the total effect. On the one hand, the rise in tourism expands the demand for labor and drives up wage, which has a positive effect on the welfare of workers. We call this effect an *wage effect*. On the other hand, the rise in input prices including wage results in the increase in output price. To the extent that real wage declines, it has a negative effect on the welfare of workers, which we refer to as a *price effect*.

The decomposition of the terms of trade effect into the two sub-effects is particularly helpful to understand the problems of "overtourism."[1] It is because the negative variety shifting effect and price effect describe most important aspects of the overtourism, besides the effect of congestion. First, in a number of cities that are popular touristic destinations, local residents are forced to migrate from a tourist-occupied historical city center to suburbs or other cities. It is because a surge of tourists boosts the demand of land used for the construction of hotels and shared houses, which

[1] For a non-economic review of the overtourism, see Perkumienė and Pranskūnienė (2019), for example.

drives up housing prices. This is an example of the price effect. In cities like Barcelona and Amsterdam, this price effect is conceived to be so detrimental that the city governments have initiated regulations against the construction of hotels in the central districts. Second, in many touristic destinations, long-established stores that used to offer various goods and services for the necessities of local residents have been replaced by souvenir shops, chain-operated cafes and fast food restaurants. Even when the stores continue the business, they attempt to change a merchandise mix to attract more tourists rather than local residents. For instance, a number of time-honored stores on the traditional Nishiki food market street at Kyoto in Japan have begun to sell a variety of take-out food, especially of a ready-to-eat-while-walking type, apparently targeting on tourists. These are examples of the variety shifting effect.

The purpose of this paper is to examine how the rise in international tourism affects the welfare of local residents, paying attention to the wage effect, variety shifting effect and price effect. For that purpose, we construct a simple model in which a home country accommodates tourists from a foreign country. The home country has three sectors, namely, the monopolistically competitive manufacturing and tourism sectors each of which produces manufacturing and tourism varieties, respectively, and the competitive agricultural sector that produces a homogenous agricultural good. Furthermore, three types of workers are distinguished; the workers who own a fixed input used in the manufacturing and tourism sectors, the workers who own a variable input used in those sectors, and the workers who are employed in the agricultural sector. It is shown that growing tourism can hurt a worker in the home country when the negative variety shifting effect and price effect outweigh the positive wage effect. It occurs when the share of the type of the worker in question is too large, and when the potential number of foreign tourists is too small. Finally, we examine the effects of government policies to reduce various costs that tourists need to pay. There is, it is shown, a possibility that such policies result in the deterioration of local residents' welfare depending on parameters.

One reservation is that this paper disregards congestion caused by the upsurge of tourists. True, congestion is one of the most marked aspects of overtourism; but for at least three reasons, we abstract it away.[2] First, considering the problem of congestion blurs the interplay of the wage effect, variety shifting effect and price effect. Thus, this paper rather focuses on the welfare effect in the economy with no externalities. Such is also the case in the above-mentioned terms of trade literature. Second, the problem of congestion is not peculiar to growing tourism: we have a rich accumulation of studies concerning the problem of congestion in various fields of economics.

[2] In a number of popular tourist destinations such as Venice, Dubrovnik and Kyoto, congestion in touristic sights and landmarks, in restaurants and shops, and in public transportation has reached to the level that threatens local residents' everyday activities. In Venice, for example, the city council has decided to charge an admission fee from July 2020 to limit the number of tourists entering the city.

Third, we could obtain any result by changing the formulation of congestion ad hoc. Because it is difficult to determine how to formulate it a priori, incorporating congestion to the analysis would always involve considerable arbitrariness.

The rest of the paper consists of six sections. In the next section, we present a basic framework. In Section 3, equilibrium is derived. The effects of rising tourism on welfare are discussed in Section 4. Section 5 extends the model to incorporate the determination of the number of foreign tourists. In Section 6, some policy implications are obtained. Section 7 concludes.

2 Model

2.1 Basic settings

Consider a small open "Home Country," or HC, which has three sectors; a manufacturing sector, tourism sector and agricultural sector. The manufacturing sector and the tourism sector are monopolistically competitive, and produce differentiated products, manufacturing varieties and tourism varieties, respectively. Both the manufacturing and tourism varieties are non-tradable. The agricultural sector is competitive and produces a homogenous good. The agricultural good is tradable between countries with 0 transport cost. Thus, its price is fixed at a given level determined in the international market. We normalize it at unity.

In that country, there are three factors of production; human capital, skilled labor and unskilled labor. Both human capital and skilled labor are used for the production of manufacturing and tourism varieties. The share of human capital used in the manufacturing sector, which is denoted by μ, is endogenously determined. Furthermore, unskilled labor is used for the production of the agricultural good. Taking a unit arbitrarily, we suppose that one unit of agricultural good is produced from one unit of unskilled labor. This implies that the wage of unskilled workers is unity.

Human capital, skilled labor and unskilled labor are owned by entrepreneurs, skilled workers and unskilled workers, respectively. A consumer of each type supplies 1 unit of human capital, 1 unit of skilled labor or 1 unit of unskilled labor, accordingly. The shares of entrepreneurs, skilled workers and unskilled workers in the total population of HC are λ_E, λ_S and $1 - \lambda_E - \lambda_S$, respectively, where $\lambda_E \in (0, 1)$ and $\lambda_S \in (0, 1)$. Taking a unit arbitrarily, we normalize the population of HC at unity. By definition, the number of entrepreneurs employed in the manufacturing sector is $\mu\lambda_E$.

In addition, tourists from "Foreign Country, " or FC, visit HC. The foreign "country" can be interpreted as a set of the countries that send tourists to HC. From FC, L consumers visit HC and consume manufacturing and tourism varieties produced in HC. For a while, L is considered given. In Section 5, however, this assumption is lifted and we discuss FC consumers' choice of the country to visit.

2.2 Consumers in Home Country

Consumers' behavior is formulated on the basis of Pflüger (2004), which is one of many New Economic Geography (NEG) models. Because it is widely used in the literature, we do not give the details of the derivation process of a demand function but rather focus on explaining notations.

Consumers in HC have an identical preference, represented by a quasi-linear utility function.

$$u^H = \alpha \ln M^H + A, \tag{1}$$

where $M^H \equiv \left[\int_{N_M} q_M^H(i)^{\frac{\sigma-1}{\sigma}} \, \mathrm{d}i\right]^{\frac{\sigma}{\sigma-1}}$ is a composite of manufacturing varieties, and A is the amount of an agricultural good. $q_M^H(i)$ is the consumption of variety i and N_M is the set of manufacturing varieties. σ is elasticity of substitution. A number of studies have found that the elasticity is considerably higher than 2 in the real economy. Thus, we assume that $\sigma > 2$, which will be used in Section 5. Furthermore, (1) indicates that HC consumers consume no tourism products. That is, the possibility that they visit local places in their own country or abroad for touristic purpose is abstracted away. One justification is that such simplification does not alter the main results, although making the analysis much less involved. In addition, we focus on the case in which there is no congestion, as has been discussed in the introduction. However, it would be quite straightforward to extend the model to incorporate congestion: we can linearly add a term that is increasing in L in the right hand side of (1).

Each HC consumer faces a budget constraint given by $P_M^H M^H + A = y$, where y is his/her income. $P_M^H \equiv \left[\int_{N_M} p_M(i)^{1-\sigma} \, \mathrm{d}i\right]^{\frac{1}{1-\sigma}}$ is a price index of manufacturing varieties and $p_M(i)$ is a price of variety i. Solving the maximization problem of each consumer yields his/her demand for each manufacturing variety and the agricultural good:

$$q_M^H(i) = \alpha p_M(i)^{-\sigma} \left(P_M^H\right)^{\sigma-1} \text{ for } i \in N_M \quad \text{and} \quad A = y - \alpha.$$

Because of the specification of the preference, the demand for each manufacturing variety is independent of income.

2.3 Consumers in Foreign Country

The preference of FC tourists differs from that of HC consumers. As a result, in addition to manufacturing varieties, tourists consume tourism varieties, which HC consumers do not consume. The most straightforward example of the tourism varieties is those of lodging and international freight services, on which international tourists spend a large part of their travel budget. Another example is the varieties of goods and services consumed when tourists visit touristic sights and landmarks like museums, historical buildings and religious facilities. In the same manner as for a HC consumer, we define $M^F \equiv \left[\int_{N_M} q_M^F(i)^{\frac{\sigma-1}{\sigma}}\, \mathrm{d}i\right]^{\frac{\sigma}{\sigma-1}}$ as a composite of the manufacturing varieties that each FC consumer consumes when he/she visits HC. Moreover, let $T \equiv \left[\int_{N_T} q_T(i)^{\frac{\sigma-1}{\sigma}}\, \mathrm{d}i\right]^{\frac{\sigma}{\sigma-1}}$ be a composite of tourism varieties. N_T and $q_T(i)$ denote the set of the tourism varieties produced in HC and the consumption of each tourism variety by a foreign tourist, respectively. Here, the elasticity of substitution between a pair of tourism varieties is assumed to be equal to that between a pair of manufacturing varieties. This assumption enables us to keep the analysis tractable, without changing fundamental qualitative results.

The FC consumers who visit HC as tourists have also a quasi-linear preference, given by

$$u^F = \beta \ln M^F + \gamma \ln T + Z.$$

Here, Z is the consumption of goods and services other than the manufacturing and tourism varieties consumed in HC. Recall that the quasi-linear preference has no income effect. In other words, the amount of expenditure on M^F and that on T are constant (β and γ, respectively). Therefore, the size of Z affects neither M^F nor T, which saves us from specifying the content of Z any further.

Tourists incur extra costs to consume varieties abroad. For example, they need to gather information on the basics of a destination country, which is common knowledge to local residents, such as currency, weather, social system and acceptable behaviors, as well as the information on the locations of the shops and restaurants that provide the goods and services they want to consume. To give another example, foreign tourists usually face a language barrier when they move within a city and when they obtain information regarding the goods and services to buy, for instance. Such factors become a source of cost to foreign tourists, which we refer to as *tourist cost*.

We assume that the tourist cost is of the iceberg form, that is, to consume one unit of a manufacturing or tourism variety, a FC consumer is required to buy more than one unit of it. This specification is conventional in the literature of international trade theory and NEG, which usually assumes that inter-regional trade entails "trade costs" of the iceberg form. Specifically, we assume that a foreign tourist needs to buy τ units of a variety produced in HC to consume one unit of it. Thus, the consumer prices of a manufacturing and tourism variety are $\tau p_M(i)$ and $\tau p_T(i)$, respectively, where $p_M(i)$ and $p_T(i)$ are the prices that a producer in HC takes. The tourist cost does not play an important role up to Section 5, because it does not affect the equilibrium prices nor the equilibrium sizes of manufacturing and tourism sectors, as long as the number of foreign tourists is fixed. However, in Section 6, we treat the tourist cost as a policy instrument of the HC government to promote foreign tourism.

The budget constraint of a FC consumer visiting HC with income y is given by $P_M^F M^F + P_T T + P_Z Z = y$, where P_Z is a price of Z. Here, $P_M^F \equiv \left[\int_{N_M} \{\tau p_M(i)\}^{1-\sigma} \, \mathrm{d}i\right]^{\frac{1}{1-\sigma}} = \tau P_M^H$ and $P_T \equiv \left[\int_{N_T} \{\tau p_T(i)\}^{1-\sigma} \, \mathrm{d}i\right]^{\frac{1}{1-\sigma}}$ are the price indexes of manufacturing and tourism varieties for foreign tourists, respectively. It is straightforward to derive the demand of a FC consumer for each manufacturing and tourism variety produced in HC:

$$q_M^F(i) = \beta\tau^{-\sigma} p_M(i)^{-\sigma} \left(P_M^F\right)^{\sigma-1} \text{ for } i \in N_M, \qquad q_T(i) = \gamma\tau^{-\sigma} p_T(i)^{-\sigma} P_T^{\sigma-1} \text{ for } i \in N_T.$$

2.4 Producers

To produce each variety, the manufacturing and tourism sectors in HC need to use f_M and f_T units of human capital as a fixed input, respectively. This implies that the numbers of varieties in the two sectors are equal to

$$n_M = \frac{\mu\lambda_E}{f_M} \quad \text{and} \quad n_T = \frac{(1-\mu)\lambda_E}{f_T}, \tag{2}$$

respectively. In addition, a_M and a_T units of skilled labor are used to produce each unit of a variety in the two sectors, respectively.

Let $Q_M(i) \equiv q_M^H(i) + L\tau q_M^F(i)$ and $Q_T(i) \equiv L\tau q_T(i)$ be the total demand for each variety in the manufacturing and tourism sectors, respectively, and w_M and w_T be the wages of entrepreneurs in these sectors. r is a wage of skilled labor. Then, the profit of a firm producing each manufacturing variety, $\pi_M(i)$, and the profit of a firm producing each tourism variety, $\pi_T(i)$, are given by $\pi_j(i) \equiv \left[p_j(i) - a_j r\right] Q_i(i) - f_j w_j$ for $j \in \{M, T\}$. The firm maximizes its profit by setting

$$p_j(v) = p_j \equiv \frac{\sigma}{\sigma-1} a_i r \quad \text{for} \quad i \in \{M, T\}.$$

Free entry and exit imply that $\pi_j(i) = 0$, or, by (2),

$$w_M = \frac{\alpha + \beta L}{\sigma\lambda_E\mu} \quad \text{and} \quad w_T = \frac{\gamma L}{\sigma\lambda_E(1-\mu)}. \tag{3}$$

Note that both w_M and w_T increase with L. It is because increase in foreign tourists brings about greater demand for human capital at the manufacturing and tourism sectors in HC.

3 Equilibrium

In this section, we derive an equilibrium for a given number of foreign tourists.

To begin, the market for skilled labor must clear at the equilibrium. This necessitates

$$a_M \int_{N_M} Q_M(i)\ \mathrm{d}i + a_T \int_{N_T} Q_T(i)\ \mathrm{d}i = \lambda_S, \tag{4}$$

where the left-hand side represents the demand for skilled labor while the right-hand side its supply.

Furthermore, in a long run, entrepreneurs in HC freely move between the manufacturing and tourism sectors based on the wage difference in the two sectors. Note that $w_M - w_T$ is a decreasing function of μ (see (3)), and positive when $\mu = 0$ while negative when $\mu = 1$. Therefore, there exists unique μ^* such that $w_M - w_T \left\{ \begin{smallmatrix} \gtreqqless \\ < \end{smallmatrix} \right\} 0$ if $\mu \left\{ \begin{smallmatrix} \lesseqqgtr \\ > \end{smallmatrix} \right\} \mu^*$. Consequently, as long as entrepreneurs have an incentive to move to the sector that offers a higher wage, the stable equilibrium distribution between the two sectors is given by μ^*.[3] This, along with the market clearing condition for skilled labor, (**??**), gives the following equilibrium values:

$$w^* = \frac{\Gamma(L)}{\sigma\lambda_E},\ \ \mu^* = \frac{B(L)}{\Gamma(L)}\ \text{ and }\ r^* = \frac{(\sigma-1)\lambda_E\Gamma(L)}{\sigma\lambda_S}, \quad \text{where } \begin{cases} B(L) \equiv \alpha + \beta L \quad \text{and} \\ \Gamma(L) \equiv \alpha + (\beta+\gamma)L. \end{cases} \tag{5}$$

The ranges of manufacturing and tourism varieties at the equilibrium, denoted by n_M^* and n_T^*, respectively, are derived from (2).

Thus, we have established the following result.

Proposition 1
For a given number of foreign tourists, equilibrium is given by (5).

The effects of a change in the number of foreign tourists on the three variables are key to understand this model. Suppose that L increases. First, (5) implies that the wage of an entrepreneur rises. This is because the demand for human capital increases as a result of the influx of foreign

[3] More specifically, one may consider the following replicator dynamics, which is a conventional way to formulate a migration process in the literature of international trade theory and NEG: $\dot{\mu} = \eta(w_M - w_T)$ for some constant $\eta > 0$.

tourists, who consume manufacturing and tourist varieties. Second, the share of the human capital used in the manufacturing sector declines. As L increases, demand for human capital rises in both the manufacturing and tourism sectors. However, the rise in the latter sector exceeds that in the former. Therefore, to recover the wage equality in the two sectors, labor distribution needs to adjust, or, more specifically, the labor supply in the manufacturing sector must shrink while that in the tourism sector must expand. In addition, this implies that HC ends up with a narrower range of manufacturing varieties but a broader range of tourism varieties. This is one of crucial observations. Third, the wage of skilled labor rises because the demand for it increases. This implies that the price of manufacturing varieties also rises, which is another crucial observation.

4 Welfare effects of growing tourism

In this section, we explore how an influx of foreign tourists affects the welfare of HC consumers.

Let us refer to entrepreneurs as type-E consumers, skilled workers as type-S consumers, and unskilled workers as type-U consumers. A HC consumer of type i enjoys the following indirect utility at an equilibrium:

$$v_i(L) = y_i + \frac{\alpha}{\sigma - 1} \ln n_M^* - \alpha \ln r^* + \alpha \left[\ln \frac{\alpha(\sigma - 1)}{a_M \sigma} - 1 \right] \tag{6}$$

for $i \in \{E, S, U\}$. Here, y_i is the equilibrium income of the consumer, that is, $y_E = w^*$, $y_S = r^*$ and $y_U = 1$. Using (6), we can easily derive the effect of a change in L on $v^i(L)$ as follows.

$$v_i{}'(L) = \frac{\mathrm{d}y_i}{\mathrm{d}L} + \frac{\alpha}{(\sigma - 1)n_M^*} \cdot \frac{\mathrm{d}n_M^*}{\mathrm{d}L} - \frac{\alpha}{r^*} \frac{\mathrm{d}r^*}{\mathrm{d}L} \tag{7}$$

for $i \in \{E, S, U\}$. This *welfare effect of growing tourism* consists of three components. The first term in the right-hand side of (7) represents the effect through the change in wage, namely, an *wage effect*. The second term represents the effect through the change in a range of manufacturing varieties, namely, a *variety shifting effect*. The last term represents the effect through the change in the price of those varieties, namely, a *price effect*.

We have already seen that $\mathrm{d}w^*/\mathrm{d}L > 0$ and $\mathrm{d}r^*/\mathrm{d}L > 0$. Therefore, the wage effect is positive for entrepreneurs and skilled workers, and 0 for unskilled workers. An influx of tourists favors the first two types of consumers in HC, because the induced increase in wage income enables them to increase agricultural good consumption. Second, since $\mathrm{d}n_M^*/\mathrm{d}L < 0$, the variety shifting effect is negative. As tourists increase, a range of manufacturing varieties shrinks, which adversely affects HC consumers. Finally, since $\mathrm{d}r^*/\mathrm{d}L > 0$, the price effect is negative. A rise in tourists boosts the input price and, therefore, the price of manufacturing varieties as well.

The first finding is about the welfare of unskilled workers. Since the wage effect is 0 for them, the total effect is necessarily negative: unskilled workers are always hurt by the rise in the foreign tourists.

Next, we turn to the welfare effects for entrepreneurs and skilled workers. (7) can be rewritten as

$$\begin{cases} {v_E}'(L) = \dfrac{\beta+\gamma}{\sigma\lambda_E} - \dfrac{\alpha^2\gamma}{(\sigma-1)B(L)\Gamma(L)} - \dfrac{\alpha(\beta+\gamma)}{\Gamma(L)} \\ {v_S}'(L) = \dfrac{(\sigma-1)(\beta+\gamma)}{\sigma\lambda_S} - \dfrac{\alpha^2\gamma}{(\sigma-1)B(L)\Gamma(L)} - \dfrac{\alpha(\beta+\gamma)}{\Gamma(L)}. \end{cases} \tag{8}$$

Inspecting the two equations in (8) tells us that both $v_E(L)$ and $v_S(L)$ are convex in L as long as $L \geq 0$. Furthermore, note that the derivative evaluated at $L = 0$ exhibits

$$ {v_i}'(0) \left\{ \begin{array}{c} \lesseqgtr \end{array} \right\} 0 \ \text{ if } \ \lambda_i \left\{ \begin{array}{c} \gtreqless \end{array} \right\} \widehat{\lambda}_i \quad \text{for} \quad i \in \{E, S\}, \tag{9}$$

where

$$\widehat{\lambda}_E \equiv \frac{\sigma-1}{\sigma} \cdot \frac{\beta+\gamma}{(\sigma-1)(\beta+\gamma)+\gamma} \in (0,1) \quad \text{and} \quad \widehat{\lambda}_S \equiv (\sigma-1)\widehat{\lambda}_E \in (0,1).$$

Thus, it is useful to consider two cases for each $i \in \{E, S\}$.

First, suppose that $\lambda_i > \widehat{\lambda}_i$. Then, (9) implies that ${v_i}'(0) < 0$. Furthermore, ${v_i}'(L)$ approaches a positive constant as L goes to infinity for $i \in \{E, S\}$.[4] Since $v_i(L)$ is convex, it has a unique minimum at a positive value of L. We call such L a *pivot number* of FC tourists and denote it by $\widehat{L}_i$. It satisfies

$$ {v_i}'(L) \left\{ \begin{array}{c} \lesseqgtr \end{array} \right\} 0 \ \text{ if } \ L \left\{ \begin{array}{c} \lesseqgtr \end{array} \right\} \widehat{L}_i \quad \text{for } \ L \geq 0 \ \text{ and } \ i \in \{E, S\}. \tag{10}$$

Second, suppose that $\lambda_i < \widehat{\lambda}_i$. Then, ${v_i}'(0) > 0$. Since $v_i(L)$ is convex, it increases for any $L \geq 0$. We have thus established the following proposition.

Proposition 2

i) If $\lambda_i > \widehat{\lambda}_i$, an increase in foreign tourists hurts type-i consumers in HC when L is smaller than $\widehat{L}_i$, while it benefits them when L exceeds $\widehat{L}_i$.

ii) If $\lambda_i < \widehat{\lambda}_i$, an increase in foreign tourists always benefits type-i consumers in HC.

Let us focus on the case where $\lambda_E > \widehat{\lambda}_E$ and $\lambda_S > \widehat{\lambda}_S$. Since $\widehat{\lambda}_E + \widehat{\lambda}_S < 1$, there exists a pair of

[4] Indeed, $\lim_{L\to\infty} {v_E}'(L) = \dfrac{\beta+\gamma}{\sigma\lambda_E}$ and $\lim_{L\to\infty} {v_S}'(L) = \dfrac{(\sigma-1)(\beta+\gamma)}{\sigma\lambda_S}$.

(λ_E, λ_S) with $\lambda_E \in (0, 1)$ and $\lambda_S \in (0, 1)$ that satisfies both conditions. In such a case, it is more likely that a type-i consumer is hurt by the increase in foreign tourists when $\widehat{L}_i$ is higher. Now, consider parameter x that affects $\widehat{L}_i$. Since

$$\frac{\mathrm{d}\widehat{L}_i}{\mathrm{d}x} = -\frac{\mathrm{d}{v_i}'(L)/\mathrm{d}x}{\mathrm{d}^2 v_i(L)/\mathrm{d}L^2}$$

and $v_i(L)$ is convex in L, the direction of the change in $\widehat{L}_i$ is opposite to that of the change in the welfare effect, given by $\mathrm{d}{v_i}'(L)/\mathrm{d}x$. Consequently, it is more likely that the increase in foreign tourists hurts a type-i consumer when the welfare effect is weaker. Thus, what matters is the impact of a change in parameters on the relative magnitudes of the three sub-effects, namely, the wage effect, variety shifting effect and price effect.

For instance, suppose that α rises and HC consumers spend more money on manufacturing varieties. First, the wage effect is independent of α for both entrepreneurs and skilled workers, as the first term at the right-hand side of each line in (8) indicates. Second, the variety shifting effect strengthens as α rises, since the absolute value of the second term at the right-hand side of each equation increases with α. This is because, when HC consumers are inclined more to manufacturing varieties, a given size of reduction in the range of these varieties is more devastating. Third, the price effect also grows as α rises: the absolute value of the third term also increases with α. The increase in the demand of HC consumers for manufacturing varieties makes the market of skilled labor more tight, which raises the wage of skilled workers and, therefore, the price of manufacturing varieties. Since the positive wage effect remains constant in size but both the two negative effects, the variety shifting effect and the price effect, grow, the overall impact is negative. Therefore, both entrepreneurs and skilled workers are more likely to be hurt by growing tourism when α is higher.

Furthermore, when λ_E is higher, that is, when entrepreneurs occupy a higher proportion of the HC population, they are more likely to be hurt by the rise in tourism. This is because the wage effect is lower when λ_E is higher but neither the variety shifting effect nor the price effect depends on λ_E. Similarly, skilled workers are more likely to be hurt when their share, λ_S, is higher. This is again because the wage effect is lower when λ_S is higher but neither the variety shifting effect nor the price effect depends on λ_S.

Impacts of the changes in other parameters are ambiguous. For example, higher β (higher expenditure on manufacturing varieties by foreign tourists) expands the wage effect for both entrepreneurs and skilled workers, and reduces variety shifting effect, both of which work in favor of the welfare of those consumers. However, the price effect grows at the same time, which has a negative impact. Thus, the sign of the total effect is ambiguous, although we can show that it is negative when L is sufficiently small.

To sum up, we have established the following result.

Proposition 3

It is more likely that entrepreneurs and skilled workers are hurt by growing tourism when the wage effect is larger, and the variety shifting effect and the price effect are smaller.

The last question is which group of consumers, entrepreneurs or skilled workers, are more likely to benefit from growing tourism. To answer the question, we compare the pivot number of foreign tourists for entrepreneurs with the counterpart for skilled workers. The following lemma is useful.

Lemma 1

$$\widehat{L}_E \left\{ \begin{array}{c} \leqq \\ > \end{array} \right\} \widehat{L}_S \;\; \textit{if} \;\; (\sigma-1)\lambda_E \left\{ \begin{array}{c} \leqq \\ > \end{array} \right\} \lambda_S.$$

Proof of Lemma ??

Note that the variety shifting effect and the price effect are common to the two types of consumers. Therefore, the difference stems from the wage effect: ${v_E}'(L) - {v_S}'(L) = \dfrac{\mathrm{d}w^*}{\mathrm{d}L} - \dfrac{\mathrm{d}r^*}{\mathrm{d}L}$, which implies that ${v_E}'(L) \left\{ \begin{array}{c} \geqq \\ < \end{array} \right\} {v_S}'(L)$ for any L if $(\sigma-1)\lambda_E \left\{ \begin{array}{c} \leqq \\ > \end{array} \right\} \lambda_S$. Thus, what remains to do is to prove that $\widehat{L}_E \left\{ \begin{array}{c} \leqq \\ > \end{array} \right\} \widehat{L}_S$ if ${v_E}'(L) \left\{ \begin{array}{c} \geqq \\ < \end{array} \right\} {v_S}'(L)$. We present a proof for the part of the statement with the uppermost equality/inequality signs, that is, $\widehat{L}_E < \widehat{L}_S$ if ${v_E}'(L) > {v_S}'(L)$. The other parts can be similarly proved. Suppose that ${v_E}'(L) > {v_S}'(L)$ for any L. By definition, ${v_E}'(L) = 0$ at $\widehat{L}_E$. Therefore, it follows from the inequality that ${v_S}'(L) < 0$ at $\widehat{L}_E$. This implies that $\widehat{L}_E < \widehat{L}_S$, since $v_S(L)$ is convex in L. ■

If $\widehat{L}_E < \widehat{L}_S$, $v_S(L)$ decreases with L whenever $v_E(L)$ decreases with L. Therefore, skilled workers are hurt by the growing tourism whenever entrepreneurs are hurt by it. If $\widehat{L}_E > \widehat{L}_S$, parallel reasoning leads to the result that entrepreneurs become worse off as a result of the increase in foreign tourists whenever skilled workers become worse off. Using the result in Lemma **??**, we obtain the following statements.

Proposition 4

i) Suppose that $\lambda_E(\sigma-1) < \lambda_S$. Then, growing tourism hurts skilled workers whenever it *hurts entrepreneurs.*

ii) Suppose that $\lambda_E(\sigma - 1) > \lambda_S$. Then, growing tourism hurts entrepreneurs whenever it hurts skilled workers.

This proposition says that skilled workers are more likely to be hurt by growing tourism than entrepreneurs, when HC has a relatively small number of entrepreneurs compared to skilled workers. The parallel result applies to entrepreneurs. In general, the proposition indicates that *the owners of relatively abundant inputs are more likely to be hurt by growing tourism*.

5 Determination of the number of foreign tourists

So far, we have been assuming that the number of the foreign tourists coming to HC, L, is given. In this section, we relax this assumption and discuss how that number is determined.

Suppose that consumers in FC have two possible tourist destinations, HC and "outer country," or OC, which may be interpreted as a set of countries. A generalized form of FC consumers' preference is given by

$$u^F_{general} = \max\left\{\beta \ln M^F + \gamma \ln T,\ \ \beta \ln \widetilde{M} + \gamma \ln \widetilde{T}\right\} + Z.$$

Here, M^F and T are the composites of manufacturing and tourism varieties that a FC consumer consumes when visiting HC, as has been defined earlier, whereas $\widetilde{M}$ and $\widetilde{T}$ are those that he/she consumes when visiting OC.

Consumers in FC choose the destination country that gives the higher utility from local consumption of manufacturing and tourism varieties. Let us denote the difference between the levels of indirect utility that are obtainable when FC consumers visit HC and OC by $\Delta(L)$, that is, $\Delta(L) \equiv \beta \ln\big(M^F/\widetilde{M}\big) + \gamma \ln\big(T/\widetilde{T}\big)$. A convenient way to define an equilibrium is to look at a stable equilibrium of a dynamics, which prescribes the behaviors of L on the assumption that consumers incur some frictions when changing destination countries. We introduce a simple dynamics given by

$$\dot{L} = \zeta \Delta(L) \quad \text{for} \quad L \in [0, F]. \tag{11}$$

Here, ζ is a positive constant, representing adjustment speed, and F is the total population of FC. According to this law of motion, the number of tourists who visit HC increases (decreases, resp.) if visiting that country gives higher utility (lower utility, resp.) than visiting OC.

To avoid an unnecessary complication, let us focus on the case in which OC has the same technologies as HC, that is, a_M, a_T, f_M and f_T also apply to the production activities in OC. Then, the difference between the levels of indirect utility is reduced to

$$\Delta(L) = \frac{1}{\sigma-1}\left[\beta \ln \frac{n_M}{\widetilde{n}_M} + \gamma \ln \frac{n_T}{\widetilde{n}_T}\right] - (\beta+\gamma)\ln \frac{\tau r}{\widetilde{\tau}\widetilde{r}}, \tag{12}$$

where $\widetilde{n}_M$, $\widetilde{n}_T$, $\widetilde{r}$, and $\widetilde{\tau}$ represent the ranges of manufacturing and tourism varieties produced in OC, wage of skilled workers in that country, and tourist cost for the FC consumers who visit OC, respectively. (12) says that a consumer expects relatively higher utility by visiting HC rather than visiting OC, when HC offers more manufacturing and tourism varieties, tourist cost to HC is lower, and the wage of skilled workers and, therefore, the price of varieties are lower in HC.

We assume that OC is so big compared to FC that the FC consumers' choices of a tourism destination have only a negligible impact on economic circumstances of OC. In particular, it is assumed that $\widetilde{n}_M$, $\widetilde{n}_T$, $\widetilde{r}$ and $\widetilde{\tau}$ are all fixed. Substituting the equilibrium values in (5), we can rewrite (12) as

$$\Delta(L) \equiv \frac{1}{\sigma-1}\Big[\beta \ln B(L) + \gamma \ln(\gamma L) - \sigma(\beta+\gamma)\ln \Gamma(L)\Big] + k, \tag{13}$$

where

$$k \equiv \frac{1}{\sigma-1}\Big[(\beta+\gamma)\ln \lambda_E - \beta \ln(\widetilde{n}_M f_M) - \gamma \ln(\widetilde{n}_T f_T)\Big] + (\beta+\gamma)\ln \frac{\sigma \lambda_S \widetilde{\tau}\widetilde{r}}{(\sigma-1)\lambda_E \tau}$$

is a constant.

Let us define

$$L' \equiv \frac{\alpha(R-1)}{2\beta} > 0, \quad \text{where} \quad R \equiv \sqrt{1 + \frac{4\beta\gamma}{(\sigma-1)(\beta+\gamma)^2}} > 1.$$

The following lemma characterizes the solution to $\Delta(L) = 0$. Fig. 1, describing $\Delta(L)$ as a $\Delta(L)$ curve, may be helpful to understand this lemma.

Insert Fig. 1 around here.

Lemma 2
Equation $\Delta(L) = 0$ *has* $\left\{\begin{array}{c}\textit{no solution}\\ \textit{one solution}\\ \textit{two solutions}\end{array}\right\}$ *in* $[0,\infty)$ *if* $\Delta(L') \left\{\begin{array}{c}<\\=\\>\end{array}\right\} 0.$

Proof

Note that

$$\Delta'(L) = \frac{\Omega(L)}{(\sigma-1)LB(L)\Gamma(L)}, \quad \text{where} \quad \Omega(L) \equiv \alpha^2\gamma - (\sigma-1)(\beta+\gamma)^2 LB(L). \tag{14}$$

Since $\Omega(L)$ is a quadratic function, it has two roots, given by L' and $L'' \equiv -\alpha(1+R)/(2\beta)$. Then, $\Omega(L) > 0$ if $L \in (L'', L')$, and $\Omega(L) < 0$ if $L > L'$. Since $L'' < 0$ and $L' > 0$, (14) implies that $\Delta(L)$ increases with L for $L \in [0, L')$ and decreases for $L > L'$. Therefore, $\Delta(L)$ has a single peak at L'. Furthermore, $\Delta(L)$ goes to negative infinity, as L approaches 0 from above and as L diverges to infinity. Consequently, there are only three possibilities about the solutions of $\Delta(L) = 0$. First, if the peak of $\Delta(L)$ lies below the horizontal axis, there is no solution. Second, if the peak happens to be on the horizontal axis, the equation has one solution. Third, if the peak lies above the horizontal axis, there are two solutions. ■

In the last case in Lemma 2, there are two solutions. However, the lower solution is associated with an unstable equilibrium: If L slightly increases from that solution, the utility difference becomes positive, which further raises L. Denoting the higher solution by L^o, we derive the following result from Lemma 2, which is illustrated in Fig. 1 above.

Proposition 5
The number of the foreign tourists coming to HC at a stable equilibrium of (11) is given by[5]

$$L^* \in \begin{cases} \{0\} & \text{if} \quad \Delta(L') \leq 0 \\ \left\{0, \ \min[L^o, F]\right\} & \text{if} \quad \Delta(L') > 0. \end{cases} \tag{15}$$

Two properties of the equilibrium are worth mentioning. First, the equilibrium number of foreign tourists does not change continuously when parameters change. Suppose that a parameter gradually changes and that $\Delta(L)$ shifts upward. L^* remains at 0 as long as $\Delta(L')$ lies below the horizontal axis. As soon as $\Delta(L')$ exceeds 0, there appears another equilibrium number, L^o. This catastrophic change indicates that there is *minimal requirement* for the number of foreign tourists: if they want to entice *some* tourists from FC, they need to entice at least this minimal requirement number of them.

Second, there are multiple equilibria when $\Delta(L') > 0$. The reason is well-known in the literature of the NEG: increasing returns in production tend to concentrate the tourism destinations of

[5]When $\Delta(L') = 0$, L^o is an equilibrium but a saddle point: it is stable when L slightly increases from L^o but unstable when L slightly decreases from L^o.

FC consumers into either HC or OC. Furthermore, the existence of multiple equilibria causes indeterminacy of equilibrium. When $\Delta(L') > 0$, whether there are foreign tourists coming to HC or not is determined for non-economic reasons such as history and expectation, as is often discussed in the NEG literature.

An important consequence of the proposition is that any change that shifts the $\Delta(L)$ curve upward in parallel causes the increase in the number of the foreign tourists coming to HC. This occurs through two channels (see Fig. 1). First, as the $\Delta(L)$ curve shifts upward gradually, $\Delta(L')$ exceeds 0 at a certain time, which switches the economy from the first case in (15) to the second. This is accompanied with the emergence of a new equilibrium number, L^o or F. Second, when $\Delta(L') > 0$, the parallel upward shift of the $\Delta(L)$ curve raises L^o.

The parameters whose changes cause such a parallel shift of the $\Delta(L)$ curve are those that affect $\Delta(L)$ only through k (see (13)). They are $\widetilde{n}_M$, $\widetilde{n}_T$, $\widetilde{r}$, $\widetilde{\tau}$, τ, λ_E and λ_S. First, the decreases in $\widetilde{n}_M$, $\widetilde{n}_T$ and τ, and the increases in $\widetilde{r}$ and $\widetilde{\tau}$ all make OC less attractive as a tourism destination, and, therefore, raises $\Delta(L)$. Second, as λ_E declines, $\Delta(L)$ increases, as long as $\sigma > 2$ (which we have been assuming).[6] On the one hand, the decrease in λ_E reduces the number of varieties produced in HC, which gives a negative impact on $\Delta(L)$. On the other hand, the decrease in λ_E makes skilled labor relatively more abundant and reduces the wage of skilled workers and, therefore, the prices of varieties. This works in favor of the utility differential. Because the latter positive impact outweighs the former negative impact, $\Delta(L)$ rises. Third, as λ_S falls, wage of skilled labor and prices of varieties rise, which makes HC less attractive for tourists.

6 Policy implication: Effects of the reduction of tourist cost

The tourist cost is one of obvious policy instruments. HC can attract more tourists from FC by reducing that cost in various ways. Examples are abundant: the HC government can cut down or eliminate taxes that tourists are to pay, such as entry and exit taxes, accommodation tax, and value-added tax; it can spread the charms of the country to people all over the world; and it can improve communication infrastructure for foreign tourists through the provision of language interpretation services and free WiFi systems, to name a few. Extreme caution is needed in implementing such policies to make the country more tourist-friendly, because our discussion in Section 4 indicates that the policies may aggravate the welfare of HC residents. The last task is to examine this possibility.

To analyze the impacts of a reduction of tourist cost, we put the following two effects together.

[6] Note that $\dfrac{\partial k}{\partial \lambda_E} = -\dfrac{(\sigma-2)(\beta+\gamma)}{(\sigma-1)\lambda_E}$.

One is the effect on the number of FC tourists coming to HC. For that purpose, we write $\Delta(L)$ as a function of not only L but also τ, as $\Delta(L;\tau)$. Obviously, $\Delta(L;\tau)$ is decreasing in τ. In other words, the decrease in τ brings about an upward shift of the $\Delta(L;\tau)$ curve. Since τ affects $\Delta(L;\tau)$ only through a shift parameter k, L' does not change. Moreover, the rightmost intercept on the horizontal axis, L^o, is now considered a function of τ, and thus, denoted as $L^o(\tau)$. Fig. 2 describes several $\Delta(L;\tau)$'s as $\Delta(L;\tau)$ curves. The other effect to consider is the welfare effect of growing tourism. As has been discussed, it is negative when the number of foreign tourists is smaller than the pivot number $\widehat{L}_i$, and positive when it is larger than the pivot number.

Insert Fig. 2 around here.

The rest of this section focuses on the equilibrium at which at least some foreign tourists come to HC, that is, the number of foreign visitors to HC is equal to $\min[L^o, F]$. Furthermore, we limit our analysis to the case with $F > L'$. If $F \leq L'$, $L^o(\tau)$ would exceed F for any τ since $L^o(\tau) > L'$. In this case, there would be no possibility that the interior equilibrium with $L^* = L^o(\tau)$ is realized. To concentrate on interesting cases, such a case is disregarded.

Now, we are ready to examine the impacts of a reduction of tourist cost. We consider three cases. First, suppose that $\widehat{L}_i$ is smaller than L' (see the first panel of Fig. 2). Then, $L^o(\tau)$ and F always exceed $\widehat{L}_i$ since $L^o(\tau) \geq L'$. Therefore, the welfare effect is positive both at $L = L^o(\tau)$ and at $L = F$. Second, suppose that $\widehat{L}_i$ lies in between L' and F (see the second panel of Fig. 2). Then, the welfare effect is positive at $L = F$. At $L = L^o(\tau)$, however, it is positive when $L^o(\tau) \in (\widehat{L}_i, F)$ whereas it is negative when $L^o(\tau) \in (L', \widehat{L}_i)$. Third and last, suppose that $\widehat{L}_i$ is larger than F (see the last panel of Fig. 2). Then, the welfare effect is negative both at $L = L^o(\tau)$ and at $L = F$.

Let

$$\lambda_E^o \equiv \frac{1}{\sigma} \quad \text{and} \quad \lambda_S^o \equiv \frac{(\sigma-1)(\beta+\gamma)(1+R)+2\gamma}{\sigma(\beta+\gamma)(1+2\gamma+R)}.$$

It is easily verified that $\lambda_E^o \in (0,1)$ and $\lambda_S^o \in (0,1)$.[7] Moreover, it is useful to introduce three critical values of τ (see Fig. 2). First, let τ' be the value of τ for which the $\Delta(L;\tau)$ curve touches the horizontal axis. In other words, τ' is a solution to $\Delta(L';\tau') = 0$. Second, we define τ^F as the value for which the rightmost intercept of the $\Delta(L;\tau)$ curve on the horizontal axis is F. That is, τ^F solves $L^o(\tau^F) = F$. Third, at the third critical value, $\widehat{\tau}_i$, the rightmost intercept becomes $\widehat{L}_i$ ($i \in \{E, S\}$). In other words, it is a solution to $L^o(\widehat{\tau}_i) = \widehat{L}_i$.

The following result immediately follows from the above argument.

[7] Note that $\lambda_S^o < 1$ is equivalent to $2\sigma\gamma(\beta+\gamma) + \beta(1+R) + \gamma(R-1) > 0$. However, R is greater than 1. Therefore, $\lambda_S^o < 1$.

Proposition 6

i) If $\lambda_i < \lambda_i^o$, then the reduction of tourist cost always benefits type-i consumers in HC.

ii) If $\lambda_i > \lambda_i^o$ and $F > \widehat{L}_i$, then, the reduction of tourist cost benefits type-i consumers in HC when $\tau \in (\tau^F, \widehat{\tau}_i)$, while it hurts them when $\tau \in (\widehat{\tau}_i, \tau')$.

iii) If $\lambda_i > \lambda_i^o$ and $F < \widehat{L}_i$, then the reduction of tourist cost always hurts type-i consumers in HC.

Proof

Remember the property of $\widehat{L}_i$ described by (10). The necessary and sufficient condition for $\widehat{L}_i$ being smaller than L' is, therefore, that $v_i(L)$ is increasing at L'. It is straightforward to show that $v_i{}'(L') \left\{ \begin{smallmatrix} \geqq \\ < \end{smallmatrix} \right\} 0$ if $\lambda_i \left\{ \begin{smallmatrix} \leqq \\ > \end{smallmatrix} \right\} \lambda_i^o$. It follows from this that

$$\widehat{L}_i \left\{ \begin{matrix} \leqq \\ > \end{matrix} \right\} L' \quad \text{if} \quad \lambda_i \left\{ \begin{matrix} \leqq \\ > \end{matrix} \right\} \lambda_i^o.$$

Furthermore, note that the conditions $L^o \in (L', \widehat{L}_i)$ and $L^o \in (\widehat{L}_i, F)$ are equivalent to $\tau \in (\widehat{\tau}_i, \tau')$ and $(\tau^F, \widehat{\tau}_i)$, respectively. These observations along with the above arguments in the text lead to the lemma. ■

The proposition says that the HC consumers' vulnerability to the reduction of tourist cost hinges upon several key factors. First, when the share of a type of consumers in HC is larger, that type are more likely to be hurt by the reduction. Second, when "potential number" of foreign tourists is smaller, it is more likely that consumers in HC become worse off by the reduction. The potential number, in turn, is smaller when FC has a smaller population and tourist cost is higher.

7 Concluding remarks

In this paper, we have examined the impacts of the rise in international tourism on the welfare of local residents. In addition to the positive effect to raise wage, it has two negative effects, namely, the effect to replace the production of the varieties for consumption of local residents (manufacturing varieties) by the production of the varieties for consumption of tourists (tourism varieties), and the effect to raise input price, which in turn enhances output price as well. By constructing a simple model, we have shown that growing tourism can hurt a worker in the home country when the negative variety shifting effect and price effect outweigh the positive wage effect. We have obtained conditions for such an adverse case to occur. Finally, we have examined the effects of government policies to reduce various costs that tourists need to pay.

This work is one of the few attempts that examine the welfare effect of growing tourism, and, in particular, the first attempt to explicate its variety shifting effect.

Several agenda are left for future research. First, we have not considered the problem of congestion. To evaluate properly the policies that promote or limit international tourism, it is necessary to pay into account that problem. If the increase in tourists aggravates congestion too rapidly, the policies to promote tourism will do harm to local residents, especially when the variety shifting effect and price effect are large. Second, empirical research to estimate the wage effect, variety shifting effect and price effect is necessary. For instance, if the data on the range and amounts of varieties provided in a particular area are available, we can estimate the impacts of changes in the number of international tourists on the varieties sold.

References

[1] Chao, C.-C., B. R. Hazari, J.-P. Laffargue, P. M. Sgro, and E. S. H. Yu (2006) “Tourism, Dutch disease and welfare in an open dynamic economy,” *The Japanese Economic Review*, 57, 501-15.

[2] Copeland, B. R. (1991) “Tourism, welfare and de-industrialization in a small open economy,” *Economica*, 58, 515-29.

[3] Faber, B. and C. Gaubert. (2018) “Tourism and economic development: Evience from Mexico’s coastline,” *NBER Working Paper Series*, 22300.

[4] Lanzara, G. and G. A. Minerva. (2019) “Tourism, amenities, and welfare in an urban setting,” *Journal of Regional Science*, 59, 452-79.

[5] Perkumienė, D. and R. Pranskūnienė. (2019) “Overtourism: Between the right to travel and residents’ rights,” *Sustainability*, 11, 2138.

[6] Pflüger, M. (2004) “A simple, analytically solvable, Chamberlinian agglomeration model,” *Regional Science and Urban Economics*, 34, 565-73.

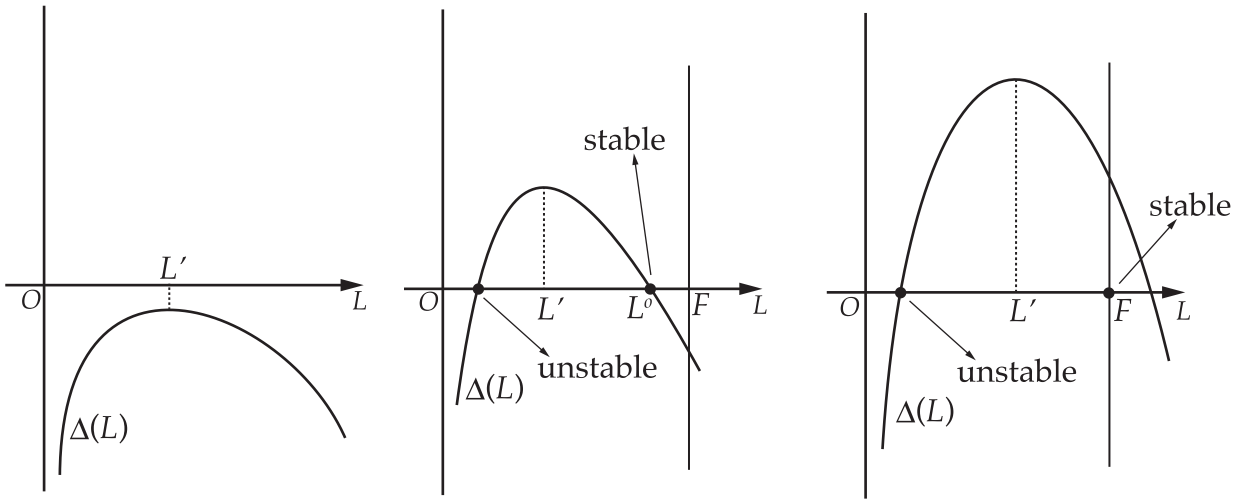

Fig. 1 Equilibrium number of foregin tourists visiting HC

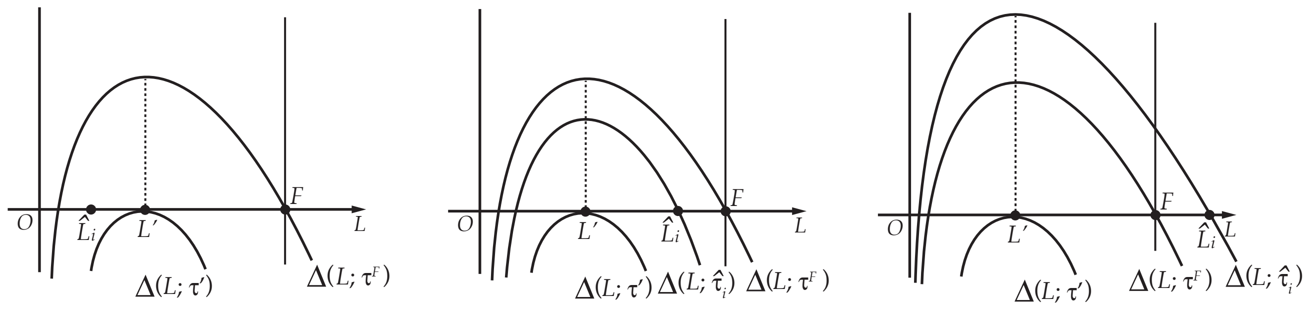

Fig. 2 Three cases of the effects of the reduction of tourist cost