Estimating Effectiveness and Attractiveness Model of Tourist Destination According to Tourism Interaction and Its Form of Behavior

Akiko KONDO [a] and Akio KONDO [b]

[a] Assistant Professor, Department of Media and Information Systems, Shikoku University, Furukawa 123-1, Ojin-cho, Tokushima, *771-1192, Japan, E-mail: kondo@keiei.shikoku-u.ac.jp*
[b] Professor, Institute of Technology and Science, The University of Tokushima, Minamijosanjima 2-1, Tokushima, *770-8506, Japan, E-mail: kondo@eco.tokushima-u.ac.jp*

Abstract: This study examines economic impact of tourism interaction on regions in Japan. We construct models that can grasp amount of inflow of tourism interaction and amount of tourism consumption as a direct economic impact of tourism interaction on regions. A tourism inflow model can express the difference between tourism factors of overnight trip and day trip. Tourism consumption per person in a destination region can be expressed by using attractiveness and geographical condition of the region as a tourism consumption model. From these models, it is quantitatively clarified that, as well as increasing an attractiveness of a region, improving information content and facilities of that region in addition to traffic convenience are important to promote internal tourism. Also, we examined the influence of improvement of information provision on tourism consumption and tourism inflow of a region by way of a simulation.

Keywords: Tourism Interaction, Attraction Model, Tourism Consumption, Policy Simulation, Economic Impact

1. INTRODUCTION

Tourism interaction is very important for revitalizing regions from the view-point of regional economy and vitality. In Japan, a policy of "Visit Japan Promotion" was introduced by the Japan Tourism Agency in 2003 and it still continues. The objective of this promotion is to attract 30 million foreign travelers per year to Japan in the future. It is needless to say that international interaction of tourism is affected by social conditions such as world affairs and economy. In addition, the vitality of internal tourism in Japan has been slowing down due to an increase in psychological and economic hurdles of international tourism.

In this situation, many regions with famous sightseeing spots have introduced unique regional tourism policies in addition to other tourist-related activities for revitalizing them by making use of policy for creation of new products and promotion of tourism led by the Japan Tourism Agency. However, some regions are still suffering from some problems mentioned before because they cannot succeed to find tourism attractiveness which is effective for drawing people and, thus, revitalizing regions.

The aims of this study are to clarify the economic influence of internal tourism on the destination region and to construct a tourist attraction model and a tourism consumption model. In addition, we perform a simulation analysis in order to examine the effectiveness of one of the tourism policies.

An outline of this study is presented in Figure 1. First, actual tourism inflow and

tourism consumption of each prefecture in Japan in 2010 are analyzed. Second, the economic impact of internal tourism in each prefecture is examined in consideration of socio-economic conditions in destination regions. Because we considered that impact of tourism consumption on the destination region is deeply related to the price of goods and population in that region. Thus, the economic impact in a region where the price of goods is low is larger than that in a region where the price of goods is high. In addition, in order to grasp the influence of attractiveness on tourism inflow and tourism consumption in a region, we construct a tourist attraction model and a tourism consumption model. We estimate total tourism consumption and conduct a policy simulation.

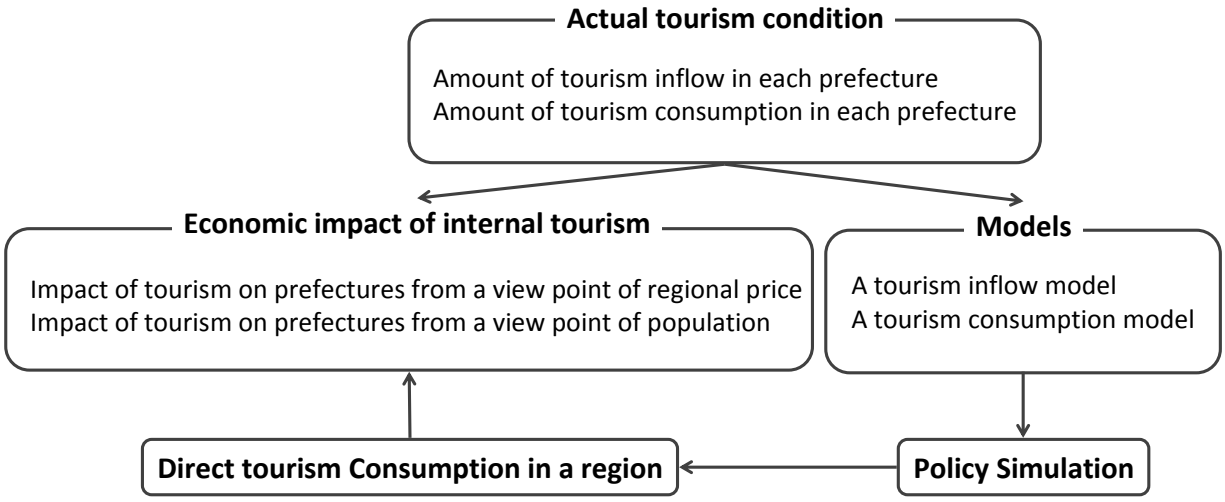

Figure 1. A Flow Chart showing the structure of this study

2. PREVIOUS SUDIES AND CHARACTERISTICS OF THIS STUDY

Tourism has been studied over the years. There have been a number of studies related to attractiveness of tourist spots and economic impact of tourism on the destination region. Concerning studies of internal tourism interaction in Japan, there have been studies that systemize the evaluative structure of attractiveness in tourist spots (e.g. Muroya, 1998). It is concluded in this study that attractiveness can be grouped into four general categories; natural resources, tourism menu, accommodation and space comfort, and ten smaller categories; resource performance, diversity and so on. Studies have been carried out where the factor analysis method is applied (e.g. Kamata et al., 2006). They found the following four factors which affect internal tourism ; natural resources, urban facilities, marine resources and hot springs. When some studies from the view point of marketing are concerned, attractiveness of tourist spot is regarded as an additional value of tourism goods (e.g. Kotler et al., 1996). They concluded that attractiveness of spots can be quantified by grasping tourism consumption. From a view point of economics, there is a study that presented analysis methods and ways of understanding economic tourism impact (e.g. Stynes, 1997), and other studies which concluded that the image of destination which tourists have affects behavioral intentions of tourists (e.g. Beerli et al., 2004 and Chen et al., 2007).

There are several previous studies related to the interaction model. The mutual relationship between interaction and migration is clarified. (e.g. Kondo et al., 2010). They focussed attention on tourism interaction and business trip, and constructed a tourism interaction model based on the Utility Maximization Theory and a business trip model based

on the Profit Maximization Theory. There have also been comparative studies of models (e.g. Bonn et al., 2008). They compare three models; the capacity utilization model (CUM), Regional economic models, Inc (REMI) and the impact analysis on planning (IMPLAN) model. Four exogenous factors dealing with economic, social, cultural and environmental impact and two endogenous factors including the variable of total impacts and support for tourism development, are analyzed with structural equation modeling procedures (e.g. Yoon et al., 2010).

In this study, we consider that tourism inflow and tourism consumption are affected by socio-economic conditions in the destination region. We construct models that explain those indicators as tourism factors in order to estimate regional attractiveness. The characteristics of this study are that mechanisms of tourism inflow and tourism consumption are analyzed using these models including attractiveness of the destination region, quantitatively. In addition, we demonstrate these models as being useful for policy simulation.

3. TOURISM INTERACTION IN JAPAN

3.1 Tourist Attraction and Tourism Consumption in Regions

It is said that an interaction consists of three forms: interaction of daily activity, interaction of business activity and interaction of community activity (e.g. Aoyama et al., 1998). From a broad perspective, regional interaction for the purpose of sightseeing, regional interaction for the purpose of business and migration between regions is one type of interaction. In this study, we define a flow of people in short term between regions having a purpose of sightseeing as a tourism interaction.

We compare an actual tourism trend of various countries. Table 1 shows the condition of tourism trend of seven countries in 2008. The data is obtained from the Report of international comparative survey of tourism trend.

Table 1. Condition of tourism trend of 7 countries

		Japan	Korea	USA	UK	Germany	French	Australia
Domestic trip	Frequency of overnight trip per year (times)	2.8	2.2	3.2	1.9	2.2	3.4	3.4
	Length of stay per capita (days)	2.0	2.7	4.4	3.2	3.4	5.8	3.9
International trip	Frequency of trip per year (times)	0.13	0.25	0.21	1.12	1.04	0.39	0.25

As shown in Table 1, the average length of stay of domestic trip of Japan was 2.0 days in 2008. On the other hand, that of France is 5.8 days. We can understand that Japan is the shortest length of stay among selected country of this survey.

The study area is Japan and 47 prefectures in Japan are used as the sample of this study. In analysis of actual interaction, we cover tourism interaction between prefectures in 2010. Number of visitors and amount of consumption are consulted from the Japan National Tourism Survey by the Japan Tourism Agency, and are used as data.

Figure 2 lists the names of prefectures in Japan and Figure 3 shows the amount of tourism inflow into 47 prefectures. Figure 4 shows tourism consumption per year in prefectures in Japan.

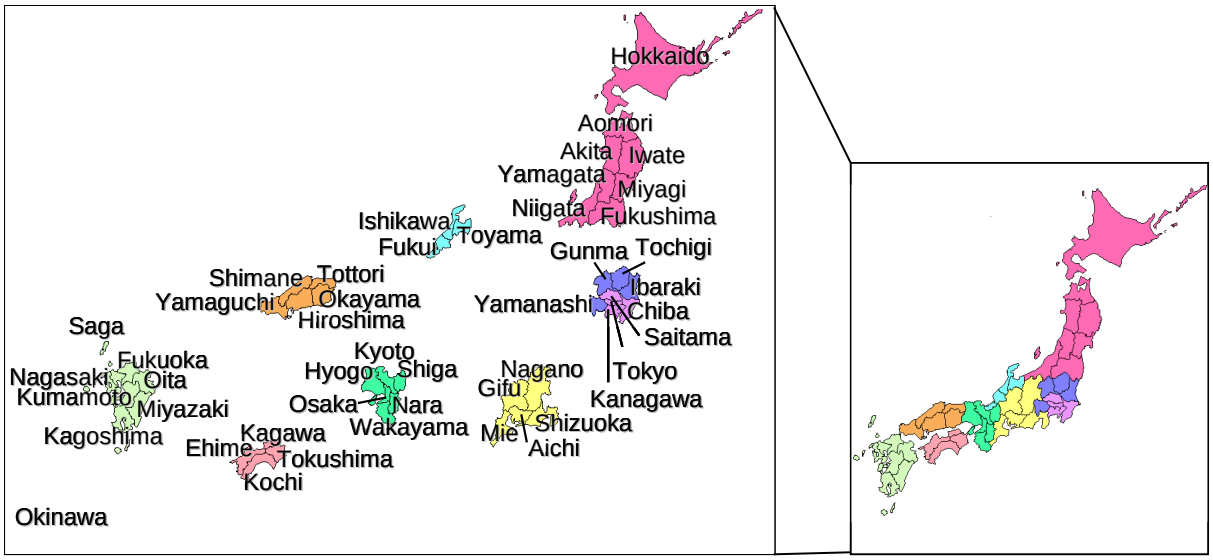

Figure 2. Name of prefectures in Japan

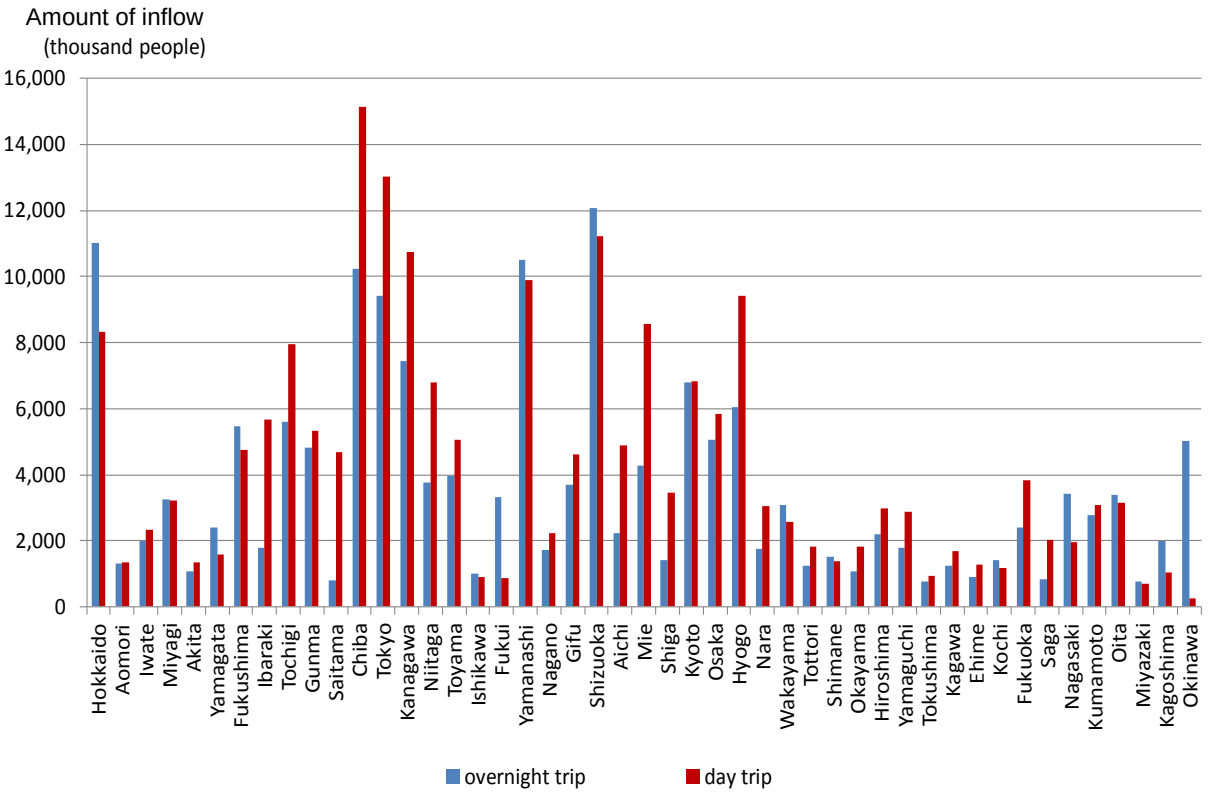

Figure 3. Amount of tourist attraction in prefectures

As shown in Figure 3, amount of inflow of overnight trip to Hokkaido and Okinawa prefectures, which are located at either ends of Japan, are very large compared to the amount of inflow of day trips. These results show the long travel time between these two prefectures and other prefectures. When people take a day trip to these regions, they do not have enough time to spend there because travel time is too long. For this reason, when people visit these prefectures, they prefer an overnight trip to a day trip. On the other hand, the amount of inflow of day trip is larger than amount of inflow of overnight trip in metropolitan areas that

are quite easy to get around. In addition, amount of inflow of interaction in Tokyo, Osaka and Nagoya areas and their surrounding areas is larger than that of other regions.

From Figure 4, it can be seen that amount of tourism consumption in Hokkaido and Okinawa prefectures, which have large market of overnight trip described previously, is large, and amount of tourism consumption in Kanto areas including Tokyo prefecture and Kinki area including Osaka and Kyoto prefectures is large, too.

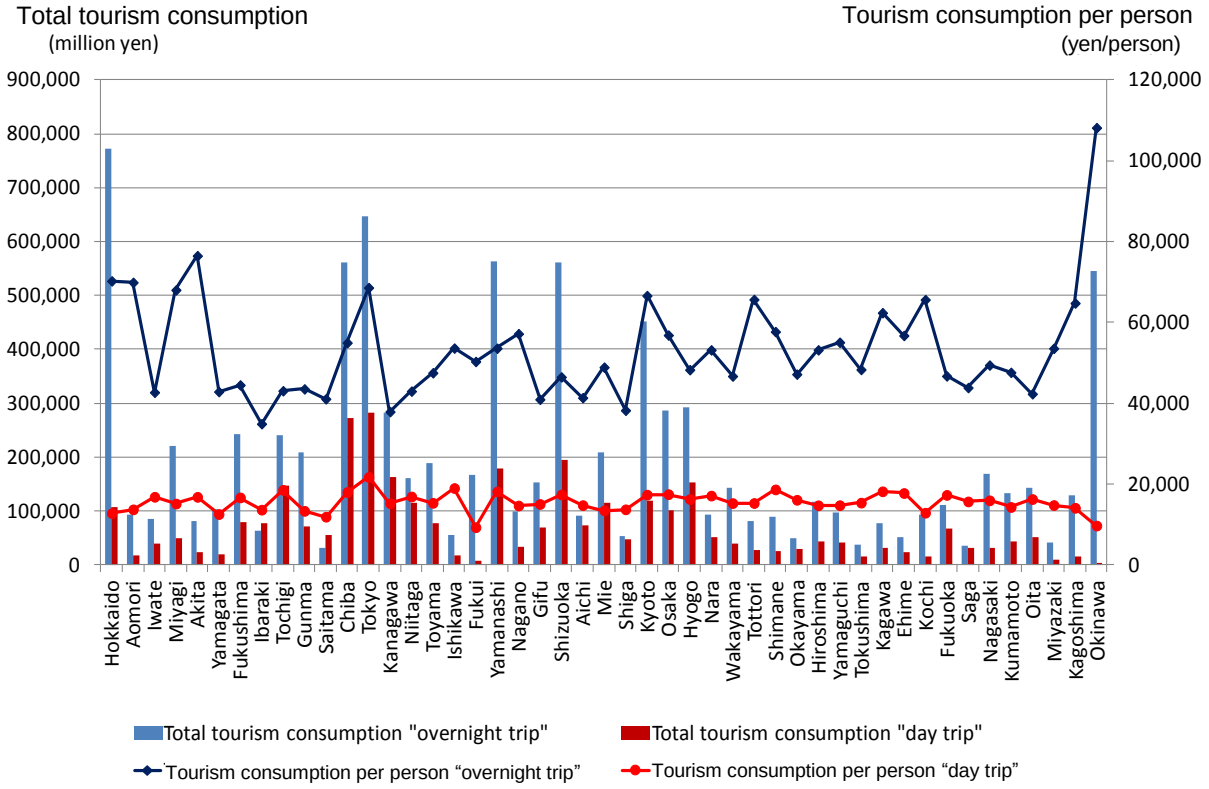

Figure 4. Amount of tourism consumption in each prefecture

3.2 Relative Analysis between Travel Time and Travel Cost

Almost all prefectures, with exception of Hokkaido and Okinawa, are connected to other prefectures by train. In addition, many prefectures, with exception of 11, have airports. Prefectures which do not have one are located nearby airports which are in other prefectures.

Traffic convenience of each prefecture is clarified based on travel time and travel cost between prefectures in 2006. Average travel time T_j and average cost C_j from other prefectures to destination prefecture are calculated using travel time t_{ij} and travel cost c_{ij} from departure prefecture i to destination prefecture j. The Calculation formula used is shown in equation (1). We do not treat domestic trip, travel time and travel cost in prefecture in this study. Therefore, the summation includes all i but i is not equal to j.

$$T_j = \frac{\sum_i t_{ij}}{n-1}$$
$$C_j = \frac{\sum_i c_{ij}}{n-1} \quad (1)$$

In this regard, *n* is the total number of prefectures. In this study, as data of travel time and travel cost, the data of NITAS (National integrated transport analysis system) issued by the Ministry and Land Infrastructure and Transport is used. NITAS is a system that calculates travel time, travel cost, travel distance by transportation modes based on the shortest path. We use data of NAVINET (Integrated transport system data base) issued by the Ministry and Land Infrastructure and Transport as alternative data when the data of NITAS does not exist. NITAS data is used for 2006 and NAVINET data is used for 2000. Average time and cost by transportation modes in prefectures in Japan are presented in Figure 5.

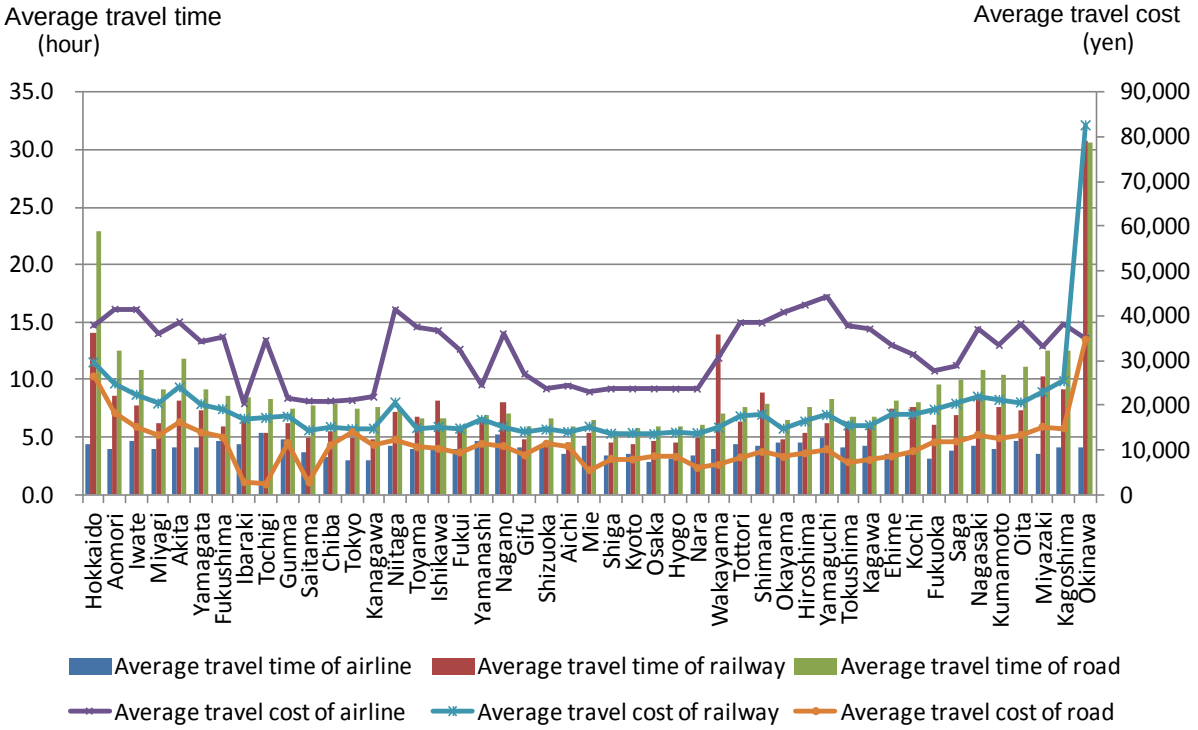

Figure 5. Average travel time and travel cost in prefectures

As shown in Figure 5, average travel time of railway and road of prefectures, which are located geographically far away from Tokyo are long in comparison with other prefectures. On the other hand, in average travel time of airline these tendencies are not seen. The correlation between average travel time and cost is analyzed using these data in order to understand degree of relationship between these indicators. Correlation coefficients of these indicators are presented in Table 2.

As shown in Table 2, correlations between average travel time and cost of railway and road are strong. However, correlation between average travel time and cost of airline is weak.

Table 2. Correlation coefficient of average travel time and average travel cost

	Average travel time of airline	Average travel time of railway	Average travel time of road	Average travel cost of airline	Average travel cost of railway	Average travel cost of road
Average travel time of airline	1					
Average travel time of railway	0.12	1				
Average travel time of road	0.11	0.88	1			
Average travel cost of airline	0.54	0.28	0.3	1		
Average travel cost of railway	0.1	0.92	0.92	0.26	1	
Average travel cost of road	0.02	0.76	0.88	0.32	0.82	1

4. TOURISM CONSUMPTION PER PERSON IN CONSIDERATION OF PRICE OF GOODS

As mentioned above, degree of economic impact of tourism on a destination region, which can be described using total tourism consumption, is influenced by regional socio-economic conditions. Therefore, regional tourism consumption can be calculated in consideration of regional difference index of price of goods and population. Fluctuation of the index of price of goods in Japan is shown in Figure 6.

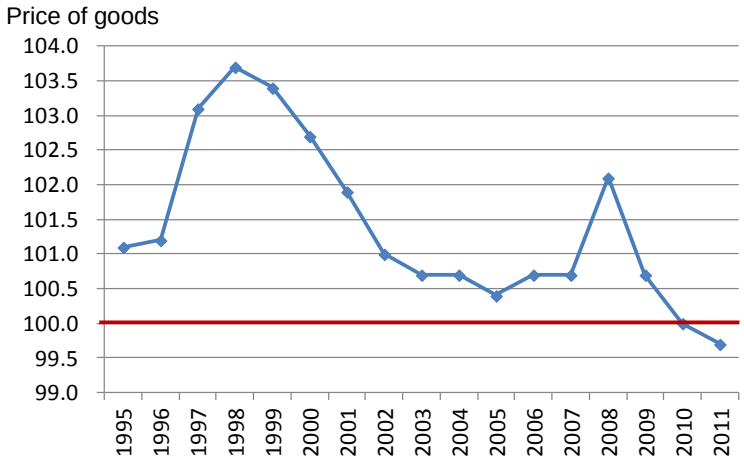

Figure 6. Fluctuation in the index of price of goods in Japan from 1995 to 2011 (value of price of goods in 2010=100)

The index of price of goods has fluctuated over the long term in Japan. It rose under the influence of rapid economic growth from 1950 to mid-1990. As shown in Figure 6, it rose from mid-1990 to late 1990 and has dropped since then.

In addition, the price of goods in regions has changed with repeated widening and redressing of inter-regional disparity. The disparity between regions of price of goods can be seen in Figure 7. These disparities lead to different values of impact of tourism in destination region.

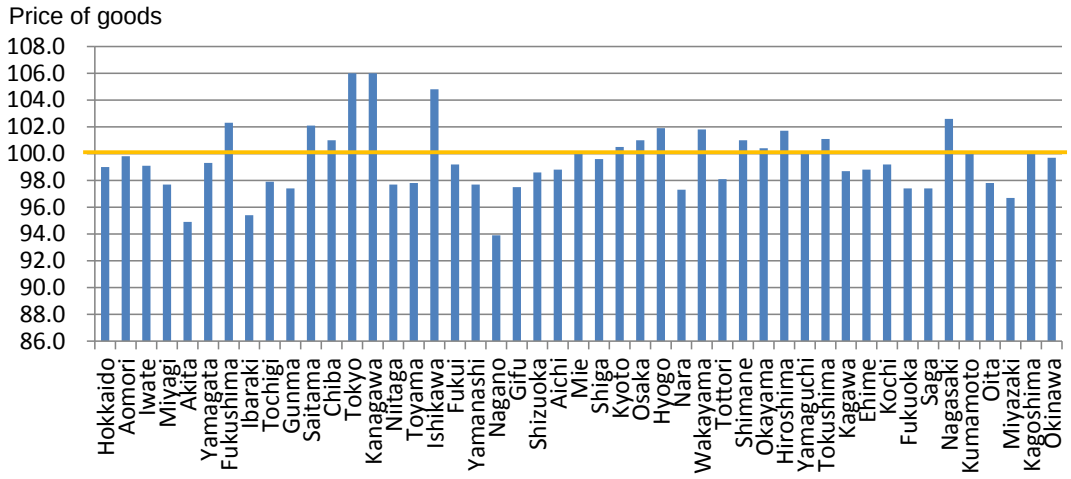

Figure 7. Regional difference in the index of price of goods in 2011
(average index of price of goods =100)

The impact of tourism consumption per person living in a given destination region differs because the population of each prefecture is different. Therefore, the value of economic impact per person for a less populated region is larger than that of a highly-populated region. In this way, the impact of tourism consumption is influenced by the price of goods and population in regions.

Tourism consumption in region j per person living there for a year tc_j is calculated using total tourism consumption in that region per year TC_j. In addition, that value is adjusted for inflation using the index of price of goods g_j. The calculation formula is shown in equation (2). P_j is population in region j.

$$tc_j = \frac{TC_j}{g_j \cdot P_j} \tag{2}$$

We compare a ranking of prefectures based on total tourism consumption per year TC_j with a ranking of prefectures based on tourism consumption per person per year tc_j. In these rankings, prefectures are arranged in descending order based on these values. Figure 7 shows the change in order of the ranking based on tc_j in comparison with the order of the ranking based on TC_j.

As shown in Figure 8, prefectures surrounded by urban areas moves down and rural areas move up in the change of order of ranking. Thus, the amount of tourism consumption per capita in rural regions is larger than that of urban areas.

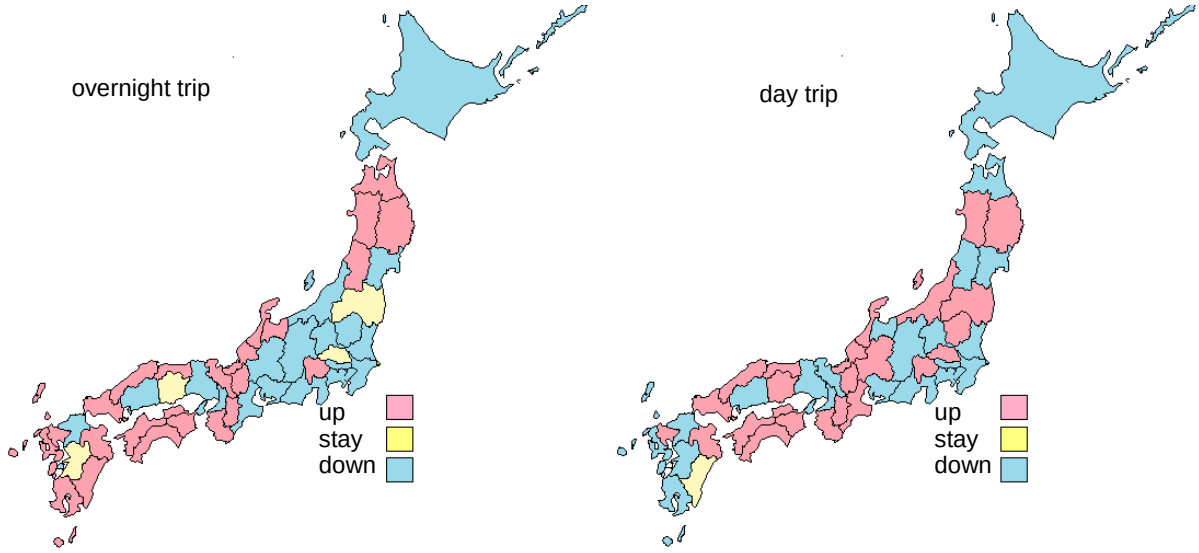

Figure 8. Change in ranking of tourism consumption

5. TOURIST ATTRACTION MODEL AND A TOURISM CONSUMPTION MODEL

The amount of inflow in tourism interaction is affected by regional attractiveness. A tourist attraction model is constructed using socio-economic indicators in a region. The tourist attraction model is assumed as shown in equation (3). The amount of inflow in tourism interaction in region j is X_j, the indicator which expresses attractiveness of a region, such as transportation convenience and amount of tourist spots in that region, is y_j and α and β are parameters.

When we carry out a policy simulation, equation (3) is not sufficient to express the total amount of inflow in tourism interaction. For example, if the values of attractiveness become larger in all regions, the amount of inflow becomes relatively larger in all regions. This is not so realistic, therefore we add the following constraint, in order to solve this problem. When we consider to the point of "t+1" which is virtually unchanged from the point of constraint "t", it is assumed that the total amount of inflow of internal tourism interaction remains the same value at the time of "t" even if the regional attractiveness changes from the time "t" to "t+1". The explanation presented above can be expressed using equations (4) and (5).

$$X_j = \beta \prod_m y_j^{(m)\alpha^{(m)}} \tag{3}$$

$$X'_{j(t+1)} = \beta \prod_m y_{j(t+1)}^{(m)\alpha^{(m)}} \tag{4}$$

$$X_{j(t+1)} = \frac{\sum_j X_j}{\sum_j X_{j(t+1)}} \cdot X'_{j(t+1)} \tag{5}$$

As mentioned above, equation (3) implies that the larger the volume of variable of explanatory variables is, the larger amount of inflow of tourism interaction of region j is. Total amount of inflow of tourism interaction in each region can be calculated by satisfying equation (4) because the total amount of inflow in all regions remains the same value at the time of "t" during the tiny interval between "t" and "t+1".

From the results of actual analysis of tourism consumption, it was found that there is little difference in prefectures regarding the amount of tourism consumption of a day trip. On the other hand, the tendency of amount of tourism consumption of overnight trip has distinct characteristics. Therefore, we construct a tourism consumption model of overnight trip. A tourism consumption model is assumed as equation (6). Amount of overnight trip consumption per person in region j is TC_j/P_j and γ and η are parameters. We use this model in a simulation analysis in the same way as we treated in the tourist attraction model, which is required to satisfy equation (7).

$$\frac{TC_j}{P_j} = \sum_l \gamma(l) \cdot y_j^{(l)} + \eta \tag{6}$$

$$\left(\frac{TC_j}{P_j}\right)'_{(t+1)} = \sum_l \gamma(l) \cdot y_{j(t+1)}^{(l)} + \eta \tag{7}$$

$$\left(\frac{TC_j}{P_j}\right)_{(t+1)} = \frac{\sum_j \left(tc_j / P_j\right)}{\left(\sum_j tc'_{j(t+1)} / P_j\right)} \cdot \left(\frac{TC_j}{P_j}\right)'_{(t+1)} \tag{8}$$

Parameters are estimated by taking the logarithm of both sides of equation (3) and this interaction model is estimated using multiple regression analysis. We consider that it is difference between factors of overnight trip and day trip, so we introduce characteristic indexes of tourism attraction. Data used as explanation variables is the data of Statistics Survey on overnight accommodation and Statistical observations of prefecture issued by Ministry of Land Infrastructure, Transport and Tourism Japan Tourism Agency and Statistics Bureau. In addition, data on the number of gourmet food outlets, which appeared in the home page of a famous Japanese travel agency, was consulted in the site of Japan “MAPPLE”. We referred to that on the 21st of Nov. in 2012. It is very difficult to obtain and count the information in consideration of quality. We use the number of information from their home page. This implies a way to offer the information on foodie destination. The estimation results are shown in Tables 3 and 4.

Concerning explanatory variables of the tourism consumption model, variables of regional attraction and regional transportation convenience are expressed by indexes as follows. The number of gourmet food outlets appeared in the home page of famous Japanese Travel Agency is used as regional attraction, and travel time from Tokyo is used as regional transportation convenience. We tried to introduce other indexes into this model, however we could not introduce them because of internal correlation, compatibility condition of sign and condition of t-value which shows considerable explanatory power.

As shown in Table 3, concerning overnight trip, information on the number of foodie destination, the number of attractive accommodation and resort facility affect the amount of inflow of tourism interaction. These indicators have a positive impact it. This means that the amount of inflow of tourism interaction of overnight trip is increased with the way to offer information on foodie destination on the internet. In addition, the amount of inflow of tourism interaction is affected by average travel cost of airline. This means that the higher travel cost of airline are, the less the amount of inflow of tourism interaction is. Previous discussed, travel cost of airline is not correlated with travel time of airline, so, if they feel a cost of airline between regions is relative expensive, they regard that the transportation convenience

of this region is not good. The amount of inflow of tourism interaction of those regions is small in comparison with that of other regions.

Table 3. Result of parameter estimation (overnight trip)

Variable	Parameter	t-value
Number of Gurmet Food Appeared in HP of Famus Japanese Travel Agency	0.318	2.655
Number of Amusement Park	0.304	1.139
Number of Japanese-Style Inn	0.217	1.672
Number of Resort Hotel	0.267	2.661
Average Travel Cost of Airline	-0.646	-1.807
Constant	10.638	2.673
Coefficient of Determination R^2	0.597	
Number of Sample	47	

Table 4. Result of parameter estimation (day out)

Variable	Parameter	t-value
Number of Department Store	0.144	1.205
Number of Museum	0.589	3.492
Number of Them Park	0.333	1.658
Average Travel Time of Railway	-0.909	-3.558
Constant	7.652	9.898
Coefficient of Determination R^2	0.632	
Number of Sample	47	

As shown in Table 4, indexes related to shopping, historical and cultural appreciation and leisure have a positive impact on day trip. In addition, average travel time of railway has a negative impact on it. This index correlates strongly with travel cost of railway and travel time and cost of road, therefore it can be said that day trip is influenced by traffic convenience of land route.

We can see from the above that, concerning overnight trip, people enjoy eating a fine meal and leisure activity and they spend days relaxing at Japanese-Style Inns in a convenient region, even if the region is far from departure place. On the other hand, concerning day trip, people enjoy shopping, historical and cultural appreciation and leisure activities in a convenient region of land route.

Next, parameters of a tourism consumption model are estimated using equation (6). The tourism consumption model is estimated using multiple regression analysis. The estimation results are shown in Table 5.

Table 5. Result of parameter estimation

Variable	Parameter	t-value
Number of Gurmet Food Appeared in HP of Famus Japanese Travel Agency	7.200	3.286
Travel Time from Tokyo	1,707	6.119
Constant	39,806	17.454
Coefficient of Determination R^2	0.543	
Number of Sample	47	

From this result, it is evident that the amount of tourism consumption per person is influenced by the number of gourmet food outlets which appeared in the home page of a famous Japanese travel agency "MAPPLE" and travel time of railway to destination region from Tokyo. This shows that people spend their money on gourmet food, which is one of the strongest motivations for the trip. In addition, the longer travel time of land route from Tokyo, the higher the cost of travel consumption. This means that people pay fewer visits regions that are far from the departure place, and they spend much money when they visit there each time.

The results of estimation in all models, as well as signs of parameters, are acceptable in statistical accuracy. The models themselves proposed in this study can be applied to any region. However, variables used in the estimated models are based on the values and behaviors of Japanese people. Therefore, if we apply these models to other countries, we should use variables in which local regional characteristics are reflected.

6. POLICY SIMULATION

We perform a simulation analysis by using the models constructed in this study. We rank prefectures based on tourism consumption per person by a year tc_j in descending order. The eight worst prefectures are picked up and we introduce a policy of that amount of gourmet food appeared in HP of that regions is increased by half.

We defined that the ranking of prefecture is as follows. When we arrange prefectures from the highest to the lowest concerning tourism consumption TC_j and tourism consumption per person tc_j, the prefecture having the highest value of tourism consumption is "rank 1", and the prefecture with the lowest value is "rank 47".

Change in tourism consumption with and without this policy $\Delta TC_{j(t+1)}$ is shown in Figure 9. Change in consumption per person with and without it $\Delta\{(TC_{j(t+1)})/P_j\}$ and a ranking based on tourism consumption per person which adjusted for inflation by using the price of goods tc_j is shown in this figure, too. Prefectures with a low ranking have serious problems to solve related to tourism consumption from the viewpoint of regional revitalization. Therefore, we focus upon prefectures which have a low ranking; up to ranking 40th, we selected them for the figure.

As shown in Figure 9, the amount of tourism consumption per person in the regions with introduction of a policy increases. Some prefectures improve their ranking when a policy is introduced compared with their previous status. In this way, both amounts of tourism inflow and tourism consumption strongly depend on the way tourism information is presented on the internet. From this result, in addition to "hard" facilities improvement, "soft" policy promotion is also required for future tourism policy concerning internal tourism.

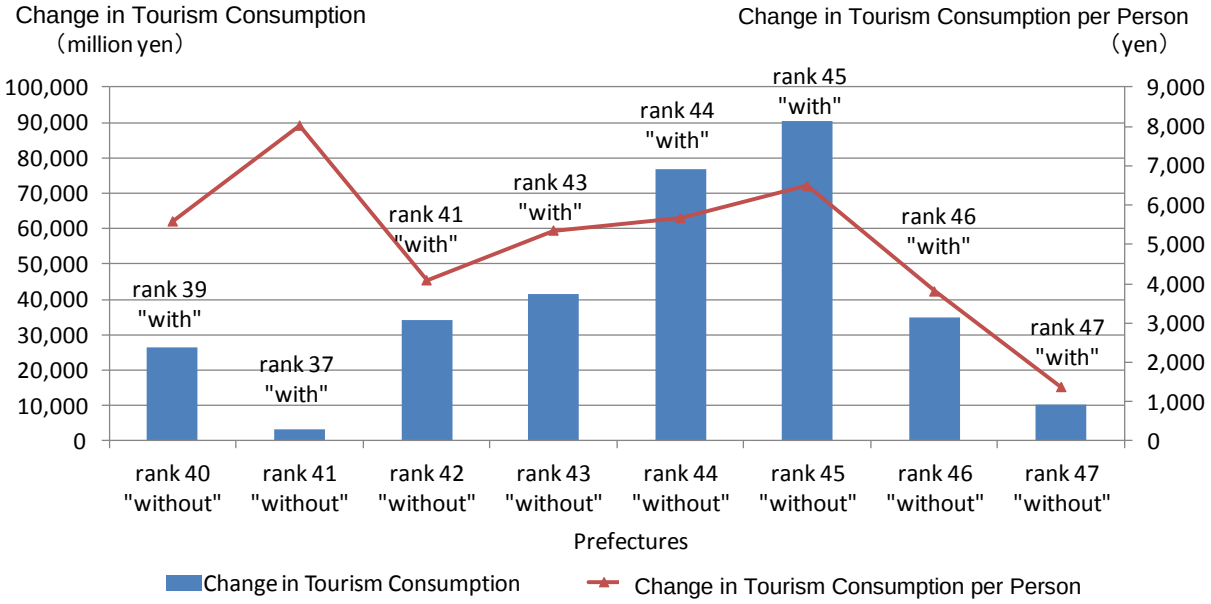

Figure 9. Change in tourism consumption with and without introduction of the policy

7. CONCLUSION

This study examined economic impact of tourism interaction on regions in Japan. Economic impact of internal tourism in regions of each prefecture was shown using the amount of tourism consumption per person, which was adjusted for inflation by using the price of goods. We constructed models that can grasp the economic influence of tourism on a particular region. In addition, we performed a simulation analysis related to economic ripple impact.

With regard to the tourist attraction model, we found that factors for overnight trip and day trip were different. When people make an overnight trip, they enjoy a fine meal and leisure activities and they spend time relaxing at Japanese-Style Inns in a convenient location, even if the region is far from departure place. On the other hand, when people make a one-day trip, they enjoy shopping, sightseeing and leisure activities in a convenient region from the view point of land transport route.

The tourism consumption model clarifies that amount of tourism consumption is affected by way of how information is offered with regional attraction on the internet. In addition, travel time of land route and the amount of tourism consumption are related each other. It is clear that people pay less visits to regions that are far from departure place, and they spend much money when they visit there once.

In order to promote internal tourism interaction, it is important not only to improve regional attractiveness, but also to improve the way of offering information about regional attractiveness and transportation convenience. In this study, we could clarify these quantitatively. Regional revitalization is one of the most important problems under the situation that we have been facing of declining population and declining birth rate and a growing proportion of elderly people. Promoting tourism interaction is beneficial and important to help with such revitalization. The models constructed and the simulation method proposed in this study can provide information contributing to promote internal interaction in Japan.

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