Impact of International and Domestic Flights to/from Japanese Local Airports on Overnight Stays of Foreign Visitors in Japan: An Analysis

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Abstract: Through a statistical analysis of data, this study aims to explore how international and domestic flights to local airports in Japan affect the number of overnight stays by Chinese, Koreans, and Taiwanese visitors in the rural areas of Japan, impacting the amount of visitor consumption. One of the main estimated results is that an increase in the number of international scheduled flights has a significant effect on the number of overnight stays by foreign visitors from the three countries/regions.

Keywords: Number of Overnight Stays, Foreign Visitors, Local Airport, Multiple Regression Model

1. INTRODUCTION

In recent times, there has been a rapid increase in the number of foreign visitors to Japan (Japan National Tourism Organization (JNTO), 2018). In 2018, the number of foreign visitors was 31 million, the largest ever, an increase of 8.7% from the previous year. In addition, the number of foreign visitors from China (without Hong Kong, hereinafter), Korea, and Taiwan accounted for 66% of the total number of foreign visitors to Japan. Since Japan is struggling with the issue of a decreasing birthrate and an aging population, it is important to maximize the economic gains resulting from foreign visitor spending from the three countries/regions.

While international flights attract attention to capture inbound demand in the rural areas of Japan, among the 31 public-managed airports by the national government, nearly 27 of them are in the red, as seen in 2015. In addition, the Fujisan Shizuoka Airport, managed by the Shizuoka local government, which is popular in Japan for an increase in the number of international flights from China, has been in the red for 7 years in a row since the airport became operational. As these examples show, the business environment of management of local airports is difficult, and it is a critical matter to maintain and increase the number of international flights.

Therefore, it is important to investigate the influence of the international flights on the number of foreign visitors to Japan’s rural areas. The object of this study is therefore to use statistical analysis to examine the effect of international flights to local airports in Japan on the number of foreign visitors and consider the direction to be taken by national and local governments regarding aviation policies for tourism based on the results of the examination.

Our examination model adopts the total number of overnight stays by Chinese, Korean, and Taiwanese visitors in rural prefectures in Japan as the dependent variable. These data were available with the "Overnight Travel Statistics Survey" by the Japan Tourism Agency, a
most accurate research on the number of foreign visitors in Japan. We also found that the proportion of "accommodation fee" spent by foreign visitors from the total consumption was large. We aim to verify the hypothesis that an increase in not only the number of direct international flights to the local airports from the three countries/regions, but also in the number of domestic flights from Tokyo and Osaka, the representative gateways in Japan, to these local airports, have an impact on the total number of overnight stays in rural areas by foreign visitors from the three countries/regions by considering data from 2012 to 2015. Finally, based on the result, we consider the direction of aviation policies to be adopted by national and local governments for tourism.

This paper is organized as follows. Section 2 reviews the current situation of foreign visitors to Japan, and their usage of the country/regional airports provides an overview of the aviation policies requiring changes for tourism. Section 3 examines previous studies. In Section 4, we explain the estimation method. The results are presented in Section 5. Section 6 presents the discussion and the policy implications based on the results. In Section 7, we describe the conclusions.

2. CONTEXTUAL BACKGROUND

2.1 Foreign Visitors to Japan, Their Number, and Their Usage of Local Airports

According to the Japan National Tourism Organization (JNTO), the number of foreign visitors to Japan in 2018 is 31 million, a record high, which has been increasing continuously since 2012, when it was 8.36 million. The number of foreign visitors has increased 3.73 times during the last six years. In addition, 85% of these foreign visitors are from Asian countries, and the total share in the number of foreign visitors from the top three countries/regions is 66%, of which China accounts for 8.38 million, South Korea 7.54 million, and Taiwan 4.76 million.

As can be seen in Figure 1, the increase in the number of the foreign visitors provides an estimate of the number of passengers in local airports. While the number of foreign entrants to Japan via local airports, other than the 7 major airports (Narita, Kansai, Haneda, Fukuoka, Naha, Chubu, and New Chitose), was 460 thousand in 2012, the number in 2016 was 1,090 thousand, 2.4 times more than the number in 2012. On the other hand, the share of foreign entrants to Japan via the local airports accounted for 5.35% in 2012, which dropped to 4.81% in 2016. This means that the growth in the number of foreign entrants to Japan via the local airports has reduced in comparison with the increase in the total number of foreign entrants.

In addition, the proportion of foreign entrants to Japan via the main airports in Tokyo and Osaka from among the total number of foreign entrants was 75.30% in 2012 and 71.51% in 2016. The network between the local airports and the airports in Tokyo and Osaka is crucial to increase the number of foreign visitors to rural areas.

Furthermore, as can be seen in Table 1 and Figure 2, the capacity of the major airports in Japan is also limited and the nationality of foreign entrants to Japan via local airports are different, though mainly from the three countries/regions. The local airports, therefore, have potential for an increase in the number of direct international flights from the three countries/regions.
Figure 1 The total number and share of foreign entrants to Japan via the local airports and the share of foreign entrants to Japan via the main airports in Tokyo and Osaka (2012-2016).
Source: Ministry of Justice (Japan), Annual Report on Statistics on Legal Migrants.
Table 1. Capacity of airports

<table>
<thead>
<tr>
<th>Airport</th>
<th>Length of Runway (m)</th>
<th>Number of Landings (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>total</td>
</tr>
<tr>
<td>Main Airport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haneda</td>
<td>3,360 / 3,000 / 2,500 / 2,500</td>
<td>224,707</td>
</tr>
<tr>
<td>Narita</td>
<td>4,000 / 2,500</td>
<td>123,550</td>
</tr>
<tr>
<td>Kansai</td>
<td>4,000 / 3,500</td>
<td>89,226</td>
</tr>
<tr>
<td>Osaka</td>
<td>(domestic airport)</td>
<td>3,000 / 1,828</td>
</tr>
<tr>
<td>Local Airport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shizuoka</td>
<td>2,500</td>
<td>4,596</td>
</tr>
<tr>
<td>Hiroshima</td>
<td>3,000</td>
<td>11,894</td>
</tr>
<tr>
<td>Kagoshima</td>
<td>3,000</td>
<td>33,049</td>
</tr>
<tr>
<td>Takamatsu</td>
<td>2,500</td>
<td>9,044</td>
</tr>
<tr>
<td>Ibaraki</td>
<td>2,700 / 2,700</td>
<td>2,510</td>
</tr>
</tbody>
</table>

The top 5 local airports in the number of foreign entrants to Japan are in the table.

Source: Japan Aviation Bureau, MLIT

The number of visitors in Main Airports (Narita, Kansai and Haneda) are one-tenth of the real number for the graphical illustration. The top 5 local airports in the number of foreign entrants to Japan are in the graph.

Figure 2 The number of foreign entrants to Japan by countries (2016)

Source: Ministry of Justice (Japan), Annual Report on Statistics on Legal Migrants.

2.2 Aviation Policy Direction for National and Local Governments to Enhance Tourism via Local Airports

The national and local governments in Japan are currently trying to increase the direct international flights to the local airports rather than domestic flights from the main airports.
In the national government’s “Ministerial Conference for the Promotion of Tourism,” under the chairmanship of the prime minister, the "Tourism Vision Realization Program" (Action Program for Realization of Tourism Vision) was drafted in 2016. Its goal is to ensure that the number of foreign visitors will be 40 million by 2020 and 60 million by 2030. The original goal was 20 million by 2020, but it was revised upward as the growth was more than expected. In the early 2020s, the aviation demand to Tokyo metropolitan airports is expected to reach maximum capacity, and for the national government, promoting rural areas in attracting foreign visitors will become very important to achieve the goal. Therefore, the national government has developed a system to certify local airports wherein local governments carry out the promotions actively as "a Special Airport supported by the national government to attract foreign visitors” and offer various forms of support to them.

In July 2017, 27 airports were certified by the national government, from which they have been categorized into three groups. The first is the "Expansion Support Type" (expected to further increase the number of foreign visitors with expansion of support by the national government. These comprises 19 airports: Shizuoka, Sendai, Kumamoto, Ibaraki, and Hokkaido (Wakkanai, Kushiro, Hakodate, Memanbetsu, Obihiro, and Asahikawa; these are all in Hokkaido prefecture and counted as a single airport); and Takamatsu, Hiroshima, Kitakyushu, Yonago, Saga, Niigata, Komatsu, Aomori, Tokushima, Kagoshima, Nankishirahama, Okayama, Yamaguchi, and Matsuyama. The second category is the "Continuous Support Type" (expected to increase the number of foreign visitors with continuous support provided by the national government), which consists of 6 airports (Nagasaki, Naha, Oita, Miyazaki, Hanamaki, and Fukushima). The third is the "Growth Support Type" (expected to increase the number of foreign visitors with the support of the national government (in strategy planning, etc.), which consists of 2 airports (Matsumoto and Shimojishima). These airports are selected based on the evaluation of the "Expert Advisory Committee."

The support by the national government involves 1) discounting the landing fees of the flights and subsidizing the start-up cost of new flights (only for the Expansion Support Type), 2) improving the airport facility and CIQ (CIQ support is only for the Expansion Support Type), and 3) undertaking active overseas promotion of the airports, etc.

We can see many cases in Japan where the local government supports the local airport. Although the details, including budget of the supports, are not disclosed even on the local government's homepage, we may understand its reach by the outline of the support in the report on the “Survey of the airports in Japan to promote their use” by the Civil Aviation Bureau in the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). The survey examines whether the support body to the local airport is solely by the local government or whether relevant local governments and business companies together offer support. In addition, the contents of the supports are generally 1) to maintain the airline networks, 2) to promote tourism, and 3) to develop conveniences for airport users. It should be noted that some of the details in the survey have been disclosed to the public. According to the survey, the Oita Airport is supported by the "Oita Airport Promotion Initiative Council,” which comprises Oita Prefecture, related municipalities, local economic organizations, and so on. It
offered a subsidy of 37 million yen (336 thousand US dollars) in the 2016 fiscal year for the land fees of the airlines operating international charter flights to introduce international scheduled flights. It also subsidized 900 thousand yen (82 thousand US dollars) in the same fiscal year to pay a bonus to the airlines that operated a new flight in the previous year. Furthermore, the present support provided by the council is not limited to new flights, but also to the current flights from Oita to Seoul. The discount in landing fees for the airlines that operate current flights was also 20 million yen (182 thousand US dollars) in the 2016 fiscal year. In addition, the subsidy for the use of airport building facilities by the airlines was 47 million yen (427 thousand US dollars) in the 2016 fiscal year. The council also supported travel companies in their advertisement expenses, and so on.

3. PREVIOUS STUDIES

Several studies have been conducted on the factors that have an impact on the total number of overnight stays by foreign visitors in Japan. Tai (2012) set the total number of overnight stays by Chinese visitors in each prefecture in 2010 and 2011 as a dependent variable. Through regression analysis, which controlled for a variety of factors, the coefficients of name recognition (the number of web pages in China) and the amount of retail sales were positive. Based on the results, Tai (2012) concluded that it is necessary for Kyushu tourism policy to improve the name recall of Kyushu by promoting tourism and so on. Yao et al. (2015) also set the total number of overnight stays by foreign visitors from China, Taiwan, and Hong Kong in each prefecture from 2007 to 2011 as a dependent variable. Through regression analysis, which also controlled for a variety of factors, the results showed that for Chinese visitors, the coefficients of the Chinese population living in Japan in the area and the name recognition were positive. For Taiwanese visitors, the coefficients of the Japanese population of the area and the name recognition were positive. For foreign visitors from Hong Kong, the coefficient of the name recognition was positive. Finally, Yao et al. (2015) concluded that an increase in the number of Chinese residents in the area and promoting name recognition were necessary to increase the number of foreign visitors. However, these studies did not consider and focus on the factors of transportation. In addition, Tai (2012) only focused on China and Yao et al. (2015) separated the model for each country/region and merely compared them.

Shimizu (2010) created a model to estimate the effectiveness of a tie-up by each prefecture and considered directions of specific actions by the Setouchi Tourism Authority which comprises related prefectures, and so on. Sakai and Hirata (2016) estimated the increase in the number of foreign visitors and places they would visit in Japan in the future, using the regression model, which includes direct international flights as one of the factors. Endo (2016) used the regression model to analyze the influence on the number of visitors from UK to foreign countries with the deregulation of international aviation rules in UK. Brueckner (2002) considered the impact of the expansion of Chicago International Airport, based on the analysis of the relationship between economic development in the city and the development of air transportation there. Button and Taylor (2000) analyzed the number of increased employers in new industries in the United States with the increase in the number of
international flights between the US and EU. However, so far, we have been unable to find previous studies on both the number of direct international flights and domestic flights from hub airports to local airports and their impact on the total number of overnight stays by foreign visitors and the aviation policies for tourism promotion by the national and local governments. Our contribution, therefore, attempts to build a basic model to estimate the impact of the number of direct international flights and domestic flights from hub airports to local airports in Japan on the total number of overnight stays by foreign visitors from the three countries/regions. Moreover, we also consider directions for aviation policies that the national and local governments in Japan must adopt for promoting tourism.

4. METHOD

4.1 Model

Our basic estimation model has the following specification.

\[
\log(S_{ijym}) = \alpha + \sum_j \beta_j N_j + \sum_k \gamma_jk N_j \cdot X_{ijymk} + \sum_y \delta_y Y_y + \sum_m \zeta_m M_m + \sum_y \sum_m \eta_yym Y_y \cdot M_m + \sum_r \theta_r R_r + \epsilon_{ijym}
\]

(1)

\( j = 1, \ldots, 3 \) \( k = 1, \ldots, 6 \) \( y = 1, \ldots, 4 \) \( m = 1, \ldots, 12 \) \( r = 1, \ldots, 7 \)

We adopt the commonly used regression model while referring to the method of Tai (2012) and Yao et al. (2015) because it makes it easier to compare it with other studies. Since we are only focusing on the impact of the number of international and domestic flights on the total number of foreign visitors, we do not have to consider the influence of the distance to these destinations.

The number of international and domestic flights in the local airports is rather small and the number of passengers will increase rapidly as the number of flights increase. The dependent variable, therefore, is changed to logarithm form.

The subscripts \( i \) represents the target prefecture, \( j \) is the nationality (China, Korea, and Taiwan), \( k \) is the independent variable, \( y \) is the year, \( m \) is the month, and \( r \) is the Region (each Region consists of several prefectures). \( S_{ijym} \) represents the monthly total number of overnight stays by Chinese, Koreans, and Taiwanese in each target prefecture (carrying out the logarithmic conversion for the distribution of the data to be normal), \( N_j \) is a dummy variable indicating the nationality of the foreign visitors, \( X_{ijymk} \) is a set of independent variables, \( N_j \cdot X_{ijymk} \) is the interaction term of the dummy variables indicating the nationality of the foreign visitors and a set of independent variables. (We set the nationality dummy to control specific factors of each country/region. The estimation results of China and Taiwan are calculated with the data of Korea as the standard value and we show the numerical data of each country/region after the calculation.) Independent variables are the monthly total number of (a) international scheduled flights, (b) domestic scheduled flights from Haneda Airport (Tokyo International Airport), (c) domestic scheduled flights from Narita International
Airport, (d) domestic scheduled flights from Osaka International Airport, (e) domestic scheduled flights from Kansai International Airport and (f) the presence or absence of Shinkansen (the bullet train). \( Y \) is the year dummy, \( M_m \) is the month dummy, \( Y \cdot M_m \) is the intersection term of the year dummy and month dummy, \( R_r \) is the Region dummy. \( \alpha \) is the constant term, \( B_j, \gamma_k, \theta_r \) are parameters to be estimated, and \( \varepsilon_{ijm} \) is an error term.

### 4.2 Data

In this model, the dependent variable is the total number of overnight stays by Chinese, Koreans, and Taiwanese, the independent variables are transportation factors such as the total number of the direct international flights, the total number of the domestic flights from Tokyo and Osaka, and the presence or absence of the Shinkansen (the bullet train), and we perform the multiple regression analysis by grouping the data of the three countries/regions into one.

The reasons for choosing this analytical method are as follows: 1) As tourism is greatly influenced by the month and year and dummies are needed to control the data, we set up the year dummy, the month dummy, and the interaction term of the dummies. 2) As the attractiveness of local areas cannot be ascribed a numerical value, we set up the Region dummy. 3) The three countries/regions have the same month dummy, year dummy, Region dummy, and error term to minimize the number of parameters as much as possible, because we consider that the total number of overnight stays by foreign visitors from the three countries/regions show a similar tendency in their size and dispersion.

We adopt the total number of overnight stays by Chinese, Koreans, and Taiwanese as the dependent variable in the rural prefectures from 2012 to 2015, as published in the "Overnight Travel Statistics Survey" by the Japan Tourism Agency. Although the survey has been published since 2007, the target accommodation facilities were changed in 2010, and since there was a huge impact of the Great East Japan Earthquake in 2011, and we decided to use the data since 2012 showing an increasing trend. As tourism demand changes dramatically depending on seasons and months and as appropriate control of the influence of the factors is necessary, we adopt the monthly panel data from the prefectures for 4 years. We should note that group tours and individual trips cannot be separated due to lack of information in the statistics. In addition, as this study is to focus on local airports, we pick up 33 prefectures of the 47 ones in Japan. The 14 prefectures excluded are Hokkaido, Tokyo, Chiba, Kanagawa, Saitama, Aichi, Gifu, Osaka, Hyogo, Nara, Kyoto, Fukuoka, and Okinawa, which have the hub airport or are considered the same as living in Tokyo, Osaka, and Aichi (according to the “Inter-regional Travel Survey” by MLIT). Furthermore, in case a prefecture has more than one airport, the data of the more prominent airport are selected. You can see Airports related to this paper and Regions in Japan in Figure 3.

As 70% of the foreign visitors in Japan use Haneda, Narita, and Kansai international airports, we can attribute the flow of foreign visitors to the prefecture to the direct international flights, domestic flights from Tokyo and Osaka, and the Shinkansen (the bullet train). The data on the number of flights were from the timetables and "Air Transport Statistics Survey" by MLIT. The Shinkansen (the bullet train) dummy is 1 when the prefecture has Shinkansen service and 0 when it does not.
In addition, we set the country dummy as Chinese dummy, Korean dummy, and Taiwanese dummy and also set the interaction terms between the country dummy and the other dummies: the number of direct international flights (different from each country), the number of the domestic flights from Tokyo and Osaka (common in all three countries/regions), and the Shinkansen dummies (common in all three countries/regions). The Region dummy was set up as a measure of the attractiveness of local areas, which cannot be given a numeric value. The Region dummy includes Tohoku, Kanto, Chubu, Kinki, Chugoku, Shikoku, Kyushu, and Tohoku dummy is the standard value. The Region dummy was also set because foreign visitors visit a prefecture as well as places in its proximity in one trip (e.g., they stay in Tokyo and visit Disneyland in Chiba) because accommodation in Japan does not meet the rapid increase in the number of foreign visitors and often, visitors have to find hotels.
far away from the sightseeing spots. Moreover, the year dummy, the month dummy, and the interaction term of the dummies control the fixed effects of each year and month carefully.

5. ESTIMATION RESULTS

Table 2 presents the descriptive statistics of the data set. Among the 4,752 samples, the difference between the number of domestic flights from Tokyo and Osaka to each airport is larger compared to direct international flights. Regarding the number of domestic flights from Haneda airport, the maximum is 170 and minimum is 0, and the standard deviation is 47.1; from Osaka International Airport, the maximum is 128 and the minimum is 0, and the standard deviation is 31.8. By contrast, the number of direct international flights has a maximum value of 33, minimum is 0, and the standard deviation is 2.76.

The estimation results are as shown in Table 3. The year dummy caused multicollinearity was excluded from the model finally. The coefficients of the number of direct international flights for foreign visitors from the three countries/regions are positive. The coefficients of the number of domestic scheduled flights from Haneda airport for Koreans and the coefficients of the number of the domestic scheduled flights from Narita, Osaka, and Kansai international airport for Chinese visitors are also positive.

According to the coefficient (elasticity) of the number of direct international flights, when the number of direct international flights from each country/region increases by 1 flight per week, the total number of overnight stays by Koreans increases by 11.5%, Chinese by 14.0%, and Taiwanese by 19.2%. Since the total number of overnight stays in the 33 prefectures in 2015 by Koreans is 1,527,910, Chinese 2,833,700, and Taiwanese 2,130,960, when the number of direct international flights from each country/region increases by 1 flight per week, the total number of overnight stays by Koreans increases by 175,655, Chinese by 396,655 and Taiwanese by 408,406. The increase in the number of direct international flights has a significant impact on the number of foreign visitors from the three countries/regions.

According to the coefficient (elasticity) of the number of the domestic flights from Haneda Airport, when the number of the flights increases by 1 flight per week, the total number of overnight stays by Korean increases by 1.11% (16,998 overnight stays in 2015).

From the coefficient (elasticity) of the number of domestic flights from Narita International Airport, when the number of flights increases by 1 flight per week, the total number of overnight stays by Chinese increases by 2.76% (78,118 overnight stays). Based on the coefficient (elasticity) of the number of domestic flights from Kansai International Airport, when the number increases by 1 flight per week, the total number of overnight stays by Chinese increases by 3.61% (102,303 overnight stays). In the case of the number of the domestic flights from Osaka International Airport, when the number increases by 1 flight per week, the total number of overnight stays by Chinese decreases by 0.750% (21,245 overnight stays).

The Shinkansen (the bullet train) dummy is negative for Korea, China, and Taiwan, regardless of whether the prefecture has the Shinkansen (the bullet train) service and it does
not affect the total number of overnight stays by foreign visitors from the three countries/regions.

Table 2. Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of overnight stays by Koreans, Chinese, and Taiwanese</td>
<td>7.10</td>
<td>1.36</td>
<td>2.30</td>
<td>11.8</td>
</tr>
<tr>
<td>(log conversion value)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korean dummy ((B_j))</td>
<td>0.333</td>
<td>0.471</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Chinese dummy ((B_j))</td>
<td>0.333</td>
<td>0.471</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Taiwanese dummy ((B_j))</td>
<td>0.333</td>
<td>0.471</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>The number of direct international flights ((\gamma_{jk}))</td>
<td>1.63</td>
<td>2.76</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>The number of domestic flights from Haneda Airport ((\gamma_{jk}))</td>
<td>46.2</td>
<td>47.1</td>
<td>0</td>
<td>170</td>
</tr>
<tr>
<td>The number of domestic flights from Narita International Airport ((\gamma_{jk}))</td>
<td>2.86</td>
<td>5.68</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>The number of domestic flights from Osaka International Airport ((\gamma_{jk}))</td>
<td>24.5</td>
<td>31.8</td>
<td>0</td>
<td>128</td>
</tr>
<tr>
<td>The number of domestic flights from Kansai International Airport ((\gamma_{jk}))</td>
<td>1.49</td>
<td>4.44</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>The Shinkansen dummy ((\gamma_{jk}))</td>
<td>0.557</td>
<td>0.497</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Tohoku Region dummy ((\theta_r))</td>
<td>0.182</td>
<td>0.386</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Kanto Region dummy ((\theta_r))</td>
<td>0.121</td>
<td>0.326</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Chubu Region dummy ((\theta_r))</td>
<td>0.182</td>
<td>0.386</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Kinki Region dummy ((\theta_r))</td>
<td>0.0606</td>
<td>0.239</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Chugoku Region dummy ((\theta_r))</td>
<td>0.152</td>
<td>0.359</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Shikoku Region dummy ((\theta_r))</td>
<td>0.121</td>
<td>0.326</td>
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<tr>
<td>Kyushu Region dummy ((\theta_r))</td>
<td>0.182</td>
<td>0.386</td>
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<tr>
<td>Observations</td>
<td>4752</td>
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</tbody>
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Table 3. Estimation results

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Robust standard error</th>
<th>Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese dummy ((B_j))</td>
<td>0.759</td>
<td>*</td>
<td>(0.338)</td>
</tr>
<tr>
<td>Taiwanese dummy ((B_j))</td>
<td>1.10</td>
<td>***</td>
<td>(0.321)</td>
</tr>
<tr>
<td>The number of International flights *</td>
<td>0.109</td>
<td>***</td>
<td>(0.0324)</td>
</tr>
<tr>
<td>Korean dummy ((\gamma_{jk}))</td>
<td>0.109</td>
<td>***</td>
<td>(0.0324)</td>
</tr>
<tr>
<td>The number of international flights *</td>
<td>0.131</td>
<td>***</td>
<td>(0.0253)</td>
</tr>
<tr>
<td>Chinese dummy ((\gamma_{jk}))</td>
<td>0.131</td>
<td>***</td>
<td>(0.0253)</td>
</tr>
<tr>
<td>Taiwanese dummy ((\gamma_{jk}))</td>
<td>0.175</td>
<td>***</td>
<td>(0.0522)</td>
</tr>
<tr>
<td>dummy</td>
<td>(\gamma_{jk})</td>
<td>(\hat{\gamma}_{jk})</td>
<td>(SE(\hat{\gamma}_{jk}))</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
The number of domestic flights from Haneda Airport * Korean dummy \((\gamma_{jk})\) & 0.0111 & *** & (0.00304) & 1.11 |
The number of domestic flights from Haneda Airport * Chinese dummy \((\gamma_{jk})\) & -0.00547 & (0.00313) & -0.546 |
The number of domestic flights from Haneda Airport * Taiwanese dummy \((\gamma_{jk})\) & -0.00104 & (0.00322) & 0.00 |
The number of domestic flights from Narita International Airport * Korean dummy \((\gamma_{jk})\) & 0.0110 & (0.0156) & 0.00 |
The number of domestic flights from Narita International Airport * Chinese dummy \((\gamma_{jk})\) & 0.0272 & * & (0.0127) & 2.76 |
The number of domestic flights from Narita International Airport * Taiwanese dummy \((\gamma_{jk})\) & 0.0198 & (0.0159) & 0.00 |
The number of domestic flights from Osaka International Airport * Korean dummy \((\gamma_{jk})\) & 0.00137 & (0.00295) & 0.00 |
The number of domestic flights from Osaka International Airport * Chinese dummy \((\gamma_{jk})\) & -0.00753 & * & (0.00359) & -0.75 |
The number of domestic flights from Osaka International Airport * Taiwanese dummy \((\gamma_{jk})\) & -0.00130 & (0.00389) & 0.00 |
The number of domestic flights from Kansai International Airport * Korean dummy \((\gamma_{jk})\) & -0.0288 & (0.0282) & 0.00 |
The number of domestic flights from Kansai International Airport * Chinese dummy \((\gamma_{jk})\) & 0.0355 & * & (0.0174) & 3.61 |
The number of domestic flights from Kansai International Airport * Taiwanese dummy \((\gamma_{jk})\) & 0.0179 & (0.0196) & 0.00 |
The Shinkansen dummy* Korean dummy \((\gamma_{jk})\) & 0.294 & (0.218) & 0.00 |
The Shinkansen dummy* Chinese dummy \((\gamma_{jk})\) & 0.226 & (0.252) & 0.00 |
The Shinkansen dummy* Taiwanese dummy \((\gamma_{jk})\) & 0.238 & (0.243) & 0.00 |
Kanto Region dummy \((\theta_r)\) & 1.17 & *** & (0.266) & 222 |
Chubu Region dummy \((\theta_r)\) & 1.01 & *** & (0.239) & 175 |
Kinki Region dummy \((\theta_r)\) & 1.55 & *** & (0.185) & 370 |
Chugoku Region dummy \((\theta_r)\) & -0.0505 & (0.208) & 0.00 |
Shikoku Region dummy \((\theta_r)\) & -0.0999 & (0.262) & 0.00 |
| Kyushu Region dummy ($\theta$) | 1.69 | *** | (0.322) | 444 |
| Adjust R² | 0.556 |
| Observations | 4752 |

The data in parentheses are robust standard errors, calculated by R program with the sandwich package. The estimation results of the year dummies, the month dummies, and the interaction dummies of the year dummies and the month dummies, and the marginal utilities of the Chinese dummy, the Taiwanese dummy, and the Region dummies are omitted for brevity.

* p <0.05  
** p <0.01,  
*** p <0.001,

6. DISCUSSION AND POLICY IMPLICATION

6.1 Discussion

In this study, we try to verify the hypothesis that the increase in the number of direct international flights to local airports from the three countries/regions and the increase in the number of domestic flights from Tokyo and Osaka to local airports have an impact on the total number of overnight stays in rural areas by foreign visitors from the three countries/regions. When we performed multiple regression analysis, we grouped the data of the three country/regions into one. Here, we consider the implications from the estimation results.

From the coefficient (elasticity) of the number of the direct international flights, when the number of direct international flights from each country/region increases by 1 flight per week, the total number of overnight stays by Koreans increases by 11.5%, Chinese by 14.0%, and Taiwanese by 19.2%. The increase in the number of the direct international flights has a significant impact on the number of foreign visitors from all the three countries/regions. However, the increase in the number of the domestic flights has little or no impact on the total number of overnight stays by Korean and Taiwanese. For Chinese, the effect of an additional direct international flight per week equals that of the increase by 5 domestic flights from Narita International Airport per week and of an increase by 4 domestic flights from Kansai International Airport per week. In addition, an increase in the number of domestic flights from Haneda Airport affects the total number of overnight stays by Koreans. This is because Seoul has many direct international flights to local airports in Japan, and any improvement in the connectivity between Haneda Airport and the local airports is likely to trigger a round-trip such as Seoul- Haneda-local airport- Seoul and more. Furthermore, the total number of overnight stays by Chinese reduces slightly with the increase in the number of domestic flights from Osaka International Airport and is increased by an increase in the number of domestic flights from Narita and Kansai International Airport. Chinese possibly go directly to stay at the destination when Narita and Kansai International Airport have better connection to local airports. The Shinkansen (the bullet train) service does not have any impact on the total
number of overnight stays by foreign visitors from the three countries/regions. The reason could be that some prefectures, such as Oita prefecture, a major tourism site for Koreans, does not have the Shinkansen (the bullet train) service.

6.2 Policy Implication

Based on the results in this study, the policies by the national government mentioned earlier concerning "the Special Airport supported by the national government to attract foreign visitors" is appropriate because the goal is to increase the direct international flights rather than domestic flights. The effects achieved by the policy will reduce air fares with the support for landing fees; area recognition will improve with PR overseas and improve CIQ faculty and Wi-Fi environment besides increasing the number of direct international flights. It is necessary to undertake further research to analyze the detailed effects on the number of foreign visitors.

In addition, we also consider that the local bodies, including the local governments, must be responsible for promoting the increase and maintenance of direct international flights in the local airports. Here, we draw a comparison between the support by the local bodies and the economic impacts of having more foreign visitors. In the case of Oita Airport, as mentioned above, the total number of overnight stays by Koreans, the majority among the foreign visitors, was 389,620 in 2015 and when an additional direct international flight from Korea per week was added, the total number of overnight stays by Koreans increased by 44,792. According to the “Consumption Trend Survey for Foreigners Visiting Japan” in 2016 by the Japan Tourism Agency, the total accommodation fee paid by Koreans is 22,000 yen (200 US dollars) per person and the average number of nights is 4.5; therefore, consumption per night becomes 4,900 yen (45 US dollars). As the accommodation fee for Korean is 31.4% of the total consumption, the total economic effect produced by Koreans is 699 million yen (6,355 thousand US dollars).

“Survey of the airports in Japan to promote their use,”, as mentioned before, reveals that “Oita Airport Promotion Initiative Council” subsidized 37 million yen (336 thousand US dollars) in the 2016 fiscal year to discount the land fees of the airlines operating international charter flights to introduce international scheduled flights. As a result, the estimate of the total economic effect by Koreans is 19 times as much as the subsidy to discount the land fees by the body.

Supposing the economic effect of the new flight is the same as that of the existing flight and the support for 1 international flight is as follows. As Oita Airport has 6 international flights per week from Korea from a total of 8 international flights in 2016, the total support per 1 international flight is \( \{(3,700+4,700+90) \times 6/8+2,100 \} / 6 = 14 \text{ million yen (127 thousand US dollars)} \). This calculation shows that the estimation of the total economic effect by Korean visitors is overwhelmingly larger than the total support per 1 international flight.

As described above, the economic effect produced by the support of the body in Oita Airport was estimated in a simple way, and it is necessary in the future to undertake further
research to analyze the detailed effects of the support on the number of foreign visitors to each prefecture.

7 - CONCLUSION

In this study, we focused on the total number of overnight stays by Chinese, Koreans, and Taiwanese in rural prefectures, which can be considered the most reliable data, and accounted for the large economic effect in visitor consumption. Then, we aimed to verify the hypothesis that an increase in the number of direct international flights to local airports from the three countries/regions and an increase in the number of domestic flights from Tokyo and Osaka to local airports have an impact on the total number of overnight stays. Moreover, based on the result, we consider the direction of the aviation policies for tourism by the national and local governments.

The result is that the increase in the number of direct international flights has a significant impact on the number of foreign visitors from all three countries/regions, although the increase in the number of the domestic flights has little or no impact on the total number of overnight stays by Koreans and Taiwanese. Furthermore, for Chinese, the effect of adding one direct international flight per week equals that of increasing 5 domestic flights from Narita International Airport per week and 4 domestic flights from Kansai International Airport per week.

Finally, we conclude that the aviation policies for tourism by the national and local governments to the local airport are appropriate based on the estimated results. In the future, it is necessary to undertake further research about the specific impact on the number of the foreign visitors from the three countries/regions supported by landing fee reduction, improvement in area recognition, and so on.

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