

Analyses on Continuance of Unpopular International Airline by Local Government

A Case of Tottori Prefecture in Japan

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Abstract— The bargaining between Asiana Airlines and Tottori Prefecture in Japan on continuation of international flight between Seoul in Korea and Yonago of Tottori in Japan in 2007 is analyzed. Nash bargaining model is employed to validate the bargaining power of both parties. Moreover, Regression Analyses are executed to find significant factors that have effects on flight users. Among others, the study finds that Tottori Prefecture had reasonable bargaining power at the bargaining process, and the two Tottori policies of User Promotion for Korean Travelers and Attraction Projects for Foreigners have been positively affected the number of users of the flights.

Keywords—Bargaining game, Multiple regression analyses, Policy analysis

I. INTRODUCTION

In Japan, according to the 1952 Airway law, the flight industry was under the control of the central government. Each flight route has been rigorously regulated by the government, and airline companies could not easily enter or withdraw their flight services. In 1986, however, the national policy had changed into a market-oriented policy, thus the entry/withdrawal and fares are now freely determined by the airline companies.

In June 4, 2007, the Japanese central government announced the basic policy for the Economic/Financial Management and Structural Reform of 2007, and the 'Asia Gateway Framework' on air transport policy. The framework plans to make Japan into the key gateway for Asian air transportation. The chosen scheme to achieve this is the deregulation of airport usage for not only national but also international flights.

In addition, the Japan-Korea agreement of mutual deregulation of airport usage came into effect in August, 2007. In the same month, however, the carrier company of the Yonago-Seoul international scheduled flight since 2001 announced its discontinuation as of October 2007 due to the low user rate in the last few years. This flight is the only international flight of Yonago airport, Tottori Prefecture, and the surrounding San-in Region. It is regarded as the key international direct connection to explore the international activities of the region. A similar problem can happen in other

local airports in Japan. For example, the Akita-Seoul international flight in Akita Prefecture was announced by the carrier company, Korean Air, that a 70% minimum user rate is required to stay in business in 2008.

The main process of events leading to the decision to continue the Yonago-Seoul international flight is given in Table I. Basically, they agreed to have a subsidy for the shortage of flight users (<70%) by Tottori Prefecture. This kind of agreement is unique and probably the first of its kind for the Japanese local government as a tool to keep the international flight services.

This study analyzes the bargaining process, especially the bargaining power, between the Asiana Airlines and the Tottori Prefecture on the continuation of the Yonago-Seoul international scheduled flights, using bargaining game theory. We also investigate the effects of promoting policies by Tottori Prefecture using multiple regression analyses. The economic benefits of the existence of the flight is also calculated.

II. ANALYSES USING BARGAINING GAME MODEL

A. Bargaining over airway service continuation

On August 20, 2007, the Asiana Airlines announced the discontinuation of the Seoul-Yonago airway service effective from October 28, 2007. Right after this announcement, Mr. Hirai, the Mayor of Tottori Prefecture, Japan, officially visited the head office of the Asiana Airlines in Seoul on August 28, 2007. His visit to Asiana Airlines was the beginning of the negotiation over the (dis)continuation of the flight. In September, 2007, the Congress of Tottori Prefecture admitted the supplementary budget of two million yen for 'Emergency Measure for User Promotion of Yonago-Seoul International Flights'. Subsequently, on October 23, 2007, two months since the discontinuous announcement by the Asiana Airlines, the four main stakeholders (Asiana Airlines, Tottori Prefecture, Tottori Organization for Promotion of Yonago-Seoul Scheduled Flight, and Korea Tourism Organization) came to an agreement. The main part of the agreement included that Tottori Prefecture would burden the cost caused by the low usage of the flight; namely, Tottori Prefecture agreed to pay 9,000 yen (3/4 of the seat unit cost of 11,700 yen) for the seats that fall short of the targeted 70% usage of each flight.

TABLE I. EXPECTED VALUE OF NASH BARGAINING SOLUTION

Year/date	Events
April 2, 2001	Yonago-Seoul flight started its service. (86.1% usage rate in July)
After Sept., 2001	September Eleventh Terrorist Attacks caused a decrease in overseas travelers.
2003	SARS (Severe Acute Respiratory Syndrome) epidemic decreased Japanese overseas travelers by 18.37% compared to 2002.
May 14, 2005	The congress of Shimane Prefecture established Take-Shima Day. GangWon Province in Korean, Tottori's sister province, announced the freeze of all exchange activities.
August 20, 2007	Asiana Airlines announced discontinuation of the flight to be effective as of October 28.
August 28, 2007	Mayor Hirai visited Asiana Airlines in Korea. The discontinuation announcement was postponed.
October 23, 2007	Asiana and Tottori agreed on the subsidy of 9,000 yen per seat for each seat that fall short of the targeted 70% usage, for the flights from October 2007 to March 2008.
November 30, 2007	The exchange between GangWon and Tottori restarted.
February, 2008	Tottori Prefecture assumed 66% user rate, and estimated nine million yen for it.
March, 2008	The user rate of the half year was 57.8%. 588 seats*9,000 yen=5,290,000 yen was paid by Tottori Prefecture. Asiana announced the tentative continuation of the flight.

Similar to other small local governments, Tottori Prefecture have little experience in negotiation and bargaining over ‘payment risk’. While Tottori Prefecture and other local Japanese prefectures have subsidy payments for deficit local bus services, they usually use lump-sum payment, and very little risk is involved. Tottori Prefecture is the first local government faced with the negotiation and bargaining of the international flight which constitutes an important international transport infrastructure of the region.

In this section, by employing the Nash bargaining concept, the actual bargaining result between Tottori Prefecture and Asiana Airlines is analyzed and validated.

B. Nash Bargaining Solution

John Nash axiomatically shows the ‘solution’ or state that should be realized after bargaining [1], which is sometimes called the ‘Nash bargaining solution’. This study uses this basic concept of bargaining solution to analyze the Asiana-

Tottori negotiation. The Nash bargaining game consists of a ‘feasible set’ of utilities that the two players involved in the bargaining can get, S , and the ‘disagreement point’, $\bar{u} = (\bar{u}_1, \bar{u}_2)$, which is what each player gets when the bargaining ends unsuccessfully. Any element of S , $u = (u_1, u_2) \in U$ can be realized for each player if the corresponding bargaining solution results. Nash shows that, if the four acceptable axioms are satisfied, only one possible solution, which can be obtained by the maximization of both player’s utility simultaneously, i.e. the product of their improvement from the disagreement point. The optimization problem is given as follows,

$$\max(u_1 - \bar{u}_1)(u_2 - \bar{u}_2) \quad (1)$$

The two-person Nash bargaining solution indicates the possible bargaining solution of the two players with tied bargaining power, especially when the bargaining process is implemented without any transaction/bargaining cost. This fact means that by comparing the theoretical bargaining solution value with the actual bargaining result, we can check if each player, especially Tottori Prefecture, had enough bargaining power in the bargaining process.

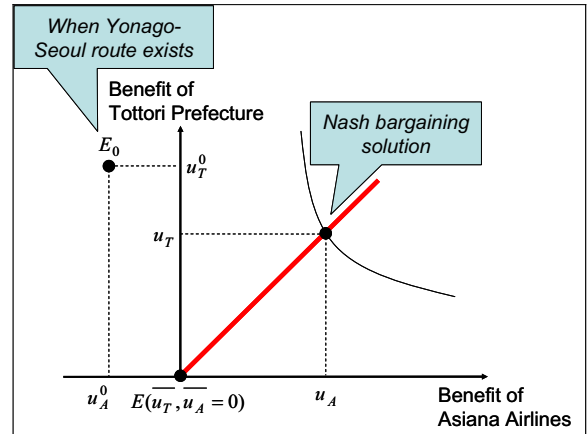


Figure 1. Nash bargaining of Yonago-Seoul flight

C. Nash Bargaining Model

Let T and A represent the two bargaining players, Tottori Prefecture and Asiana Airlines, respectively. Also, let the utilities for them be indicated by u_T and u_A , respectively. The disagreement point is set as the case when Yonago-Seoul flight does not exist. And the utilities of the disagreement point are indicated as \bar{u}_T and \bar{u}_A for players T and A , respectively.

For the cost and benefits we consider the following factors.

Tottori Prefecture:

T-1) Benefit from travel time-saving

T-2) Benefit from visitors from Korea

T-3) Cost for emergency supplemental measure

Asiana Airline:

A-1) Benefit from the Yonago-Seoul scheduled flights

A-2) Benefit from supplemental payment by Tottori

By considering the costs and benefits for Tottori Prefecture as stated above, we can regard the disagreement case of no scheduled flight as the zero utility case, $\bar{u}_T = 0$. Also, we assume a zero opportunity cost of Yonago-Seoul scheduled flights for Asiana Airline. This is partly because the airport user charge and the landing/departure charges have been all waived by Tottori Prefecture since the establishment of the flight. Also, when discontinuing the flights, the carrier may be used for another international or national flight line without much cost. With this assumption, we also assume $\bar{u}_A = 0$. Fig. 1 shows the concept of Nash bargaining on Yonago-Seoul scheduled flights; the vertical axis is the utility of Tottori Prefecture while the horizontal axis is the one for Asiana Airlines. When the flight is available, the benefit of Tottori Prefecture, u_T^0 , and the one for the Asiana Airline, u_A^0 , have the relationship of $\bar{u}_T < u_T < u_T^0$ and $u_A^0 < \bar{u}_A < u_A$ as shown in the Fig.1. The crossing point of the two lines, the 45 degree line from the disagreement point and the curve line which shows the Nash product, is the Nash bargaining solution. The status-quo, the situation under negotiation, is indicated as E_0 in Fig. 1, where the flight is in operation without any supplemental aids from Tottori Prefecture. Asiana Airlines is then assumed to be in deficit.

The benefit of [T-1] is the time-saving benefit of travelling compared to the case when travelers have to use other nearby airports due to the discontinuation of the Yonago-Seoul flight. The benefit of [T-2] is the economic effects including reverberation by the travelers from Korea to Tottori. The cost of [T-3] is the payment from Tottori to Asiana Airlines for supplement of less-than-70% usage of the flights.

On the Asiana side, the benefit of [A-1] is the direct benefit from users of the flight. The benefit of [A-2] is the supplemental payment from Tottori and is exactly the same as the cost [T-3] of Tottori Prefecture.

With these costs and benefits, the total payoffs for each player can be modeled as follows:

$$u_T(\varepsilon, x_t) = b + B - \max(\varepsilon - x_t, 0) \times \gamma NA \quad (2)$$

$$u_A(\varepsilon, x_t) = NA(x_t + \max(\varepsilon - x_t, 0) \times \gamma) \quad (3)$$

where b : the benefit from Korean travelers, B : the benefit for travelers living in Tottori, ε : targeting user ratio, x_t : user ratio in year t , N : the total number of travelers seats available annually, A : unit cost for each seat, γ : the ratio of supplemental payment.

By solving the problem of (1) with equations (2) and (3), the following Nash bargaining solution results,

$$\varepsilon = \frac{1}{2\gamma} \left(\frac{b + B}{NA} - x_t \right) + x_t \quad (4)$$

In the problem of (1), (2) and (3), there are two unknowns, ε and γ . These two variables are always in the form of a product, namely, $\gamma \cdot \varepsilon$. We cannot determine both simultaneously. As a matter of fact, ‘which percent should we have as user ratio’ and ‘which percent of the unit cost of each seat should be supplementally paid’ are complementarily the same problem. In this study, we use the actual result of

$\gamma = \frac{3}{4}$ as given, and find ε as the bargaining solution. So, we alternatively rewrite the equation (4) as follows.

$$\varepsilon = \frac{2}{3} \left(\frac{b + B}{NA} - x_t \right) + x_t \quad (5)$$

By determining the value of the equation (5) we get the theoretical bargaining solution.

D. Calibration of Nash Bargaining Solution

By applying the actual data to equation (5), the value of the theoretical bargaining solution can be obtained. First, consider the costs/benefits of Tottori Prefecture. For the benefit of B, we used the research report from Mitsubishi Research Institute. They assume that the travelers from Tottori Prefecture uses Okayama, Hiroshima, Kansai, and Fukuoka airports as alternatives if the Yonago flight is discontinued with certain fixed user ratios. Based on the survey in 2005 on international flight travelers movement, the average time saving is calculated as 138 minutes. The time value is calculated from 2006 monthly labor statistics survey, and obtained as 30 yen per minute. Also, the difference of actual travel cost is 6,128 yen. As the number of travelers from Tottori to Korea, we use the number of Japanese users of the Yonago-Seoul flights in 2006, namely, 19,287. With these numbers, the annual benefit of Tottori Prefecture, B, is given as follows:

$$B = 19,287 \times (30 \times 138 + 6,128) = 198,038,916$$

Next, we need the average annual user ratio of year 2007, x_{2007} . Because the expectations of both players are not announced, we use the actual annual user ratio in 2006, 55.5%, as their expectation.

The other benefit of Tottori Prefecture, b , is from Korean travelers. We assume that both players expect the same amount of travelers as year in the 2006, namely, 12,309 persons from Korea. The benefit from Korean travelers is obtained by multiplying the total number of visitors, personal expenditure, and inducement rate. Based on the Survey of Visitors’ Consumption in Japan 2005, Korean visitors’ expenditure is assumed to be 12,168 yen per day multiplied by the expected term of stay of three days. The inducement rate is calculated from, the Year 2000 Industrial I-O Table of Tottori Prefecture (which gives the value of 1.34) and then by adding the household internalization, resulting into 1.60 as a whole.

As a result, the economic benefit from Korean visitors in year 2008 is calculated as:

$$b = 12,309 / 2 \times (12,168 \times 3) \times 1.60 = 359,462,188.8$$

For the annual seats available, the Yonago-Seoul flight mainly uses A-321 (which has 177 seats) and flies three times a week since 2004. The flight was expected to fly 78 times from October to March during the fiscal year 2008. Therefore, the annual seats available, N , is expected to be 55,224 seats:

The unit cost of each seat of the flight was calculated by Tottori Prefecture from the deficit of 435,000 yen for each flight reported from Asiana Airlines. The difference in seat number from the 70% usage case and the actual usage rate of 49% between January and July of 2007 is $177 \times (0.7 - 0.49) = 37$ seats. By assuming that all deficits are from the lack of usage, the deficit for each seat can be calculated as $43,500/37 = 11,757$ yen.

E. Value of Nash Bargaining Solution

With all the values obtained above, we can obtain the Nash bargaining solution value. It is given in Table II.

The targeting usage rate in 2007 is obtained as 75.7%, and this is more than 5% greater than the actual bargaining results of 70%. This means that Tottori Prefecture had a fairly valid bargaining result in reality; the fictitious calculation of Nash bargaining indicates less than equal bargaining power, the result might have been worse given a higher request on the supplemental payment target. Other lows in Table II show the Nash bargaining results from futures calculated by using future numbers of flight users calculated by simple regression models. With time the users decrease and the bargaining results of target user rate increases. It goes beyond 80% in year 2010, and the expected payment is over 100 million yen.

The actual flight supplemental payment was made for the half year period between October 1, 2007 to March 31, 2008. The actual user rate was below 70% but was 67.8% and is much higher than calculated in this study. The payment itself was therefore quite limited and was that of 588 seats multiplied by 9,000 yen, which equals to 5,292,000 yen.

This rapid recovery of flight usage rate in the short time period is the result of collaborative promotions by governmental and private bodies in Tottori Prefecture; they shared the recognition that the usage rate of this half year may bring about critical determination of the point of no return for the international flight of Tottori.

Asiana Airlines, after observing the half year results, as well as the efforts by the Japanese side, announced the tentative postponement of the discontinuation of the flight. While the international flight is now under operation, it is still under risk of discontinuation by Asiana Airlines. The many supporting activities by Tottori's side during the half year of emergency promotion are not sustainable ones, it is important for Tottori to find effective supporting policies to maintain 70% usage rate of the flight. Additionally, the decision to continue by Asiana Airlines even during below 70% usage rate could be tentatively done due to the lack of popularity of international travels under high fuel surcharges and the transaction cost to switch resources such as airplanes used for the Yonago flight to other airway usages.

The usage rate supplemental scheme itself is not a bad idea at all. A similar scheme has been used in Toyama Airport in

Japan to enhance the national flight between Toyama and Tokyo. The Toyama case ended up with successful results of increased flight services and more users with almost no payment from the local government. The success of the scheme depends on how carefully the targeting values such as the supplemental usage rate and subsidy value can be designed so that incentives of all stakeholders can be enhanced rather than discouraged.

TABLE II. EXPECTED VALUE OF NASH BARGAINING SOLUTION

year	Usage rate	Korean	Japanese	Target rate
2008	55.44	13,983	16,635	77.93
2009	55.12	14,920	15,524	79.48
2010	54.81	15,858	14,413	81.02

III. TOTAL BENEFIT OF THE INTERNATIONAL FLIGHT

It is interesting to recognize the overall Tottori benefit of the Yonago-Seoul International scheduled flight. As we already mentioned, the benefit consists of the travel time/cost saving and direct economic benefit from Korean travelers.

Because the time/cost saving effect is calculated as 10,268 yen per person, we can get the overall time/cost saving benefit by multiplying it by the expected number of Tottori travelers. By employing the actual number of Tottori travelers in 2007, the expected number of travelers is 18,615. So the total benefit will be 191,138,820 yen.

On the other hand, the economic benefit from Korean travelers was calculated as 58,406.4 yen per traveler. By multiplying the half number of the Korean user of the Yonago-Seoul flights in 2007, 6,023, we get 351,781,747.2 yen. By adding these two effects of time/cost saving benefit and the benefit from Korean visitors, we get the annual benefit of the Yonago-Seoul international flight, 542,920,567.2 yen.

IV. FACTORS AFFECTING FLIGHT USAGE

Tottori Prefecture had implemented emergency counter measures of flight usage support right after the announcement by Asiana Airlines in 2007. It has been only about one year since such measures were started. So we still need some time to investigate the effects of these measures. In this section, we will investigate the effects of the local policies that Tottori Prefecture has been using since the start of the Yonago-Seoul international flight in 2001. The analyses are all based on statistical regression analyses, especially multi-regression analyses.

A. Data for Multiple Regression Analyses

Over 90% of users of Yonago-Seoul international flights have been Japanese or Korean. So the analyses are focused on travelers of these two nationalities. Tottori Prefecture has different promoting policies for these two types of travelers.

The explained variables are the number of Japanese/Korean travelers. The explanatory variables are, on the other hand, given as follows:

- a) Expenditure for Executives for User Promotion of Yonago-Seoul International Scheduled Flight. [1,000yen]
- b) Expenditure for Attraction Project of Foreign Tourists [person]
- c) Number of Japanese visitors going to Korea [person]
- d) Number of Korean visitors going to Japan [person]
- e) Number of deceased from airplane accidents [person]
- f) Value of oil [yen/KL]
- g) Exchange rate of Korean Won [yen per 100 won]
- h) Japanese GDP [US\$]
- i) Korean GDP [US\$]
- j) Travelers of Yonago-Tokyo scheduled domestic flights [person]
- k) Travelers of Yonago-Nagoya scheduled domestic flights [person]
- l) Number of users of Okayama-Seoul international flights at Okayama Airport [person]

We employ the log-linear functions for regression. For the data which have contain 0 in least one value, we added 1,000 to it to avoid infinite number involved due to log transformation of the values.

B. Regression Analyses for Japanese Users

For regression of Japanese users, we use the data from a), c), e), f), g), h), j), k), and l). The resulting equation is as follows.

$$\ln y = 1.1255145^{**} \ln x_1 + 0.3058008^{**} \ln x_2 - 9.78075^* \quad (6)$$

where y is the number of Japanese users of Yonago-Seoul international flight, x_1 is the total number of Japanese visiting to Korea, x_2 is the expenditure of Executives for User Promotion of Yonago-Seoul International Scheduled Flight. The upperscript of ** on each coefficient shows 5% significance while * indicates 10% significance.

Two factors determine the number of Japanese users of the Yonago flight. The first factor is the total Japanese visitors to Korea. This shows that even in the local flight of Yonago, the 'Korean boom' in Japan, which started in late 2003, is an influential factor. Fig. 2 shows the Japanese and Korean visitors visiting their partner countries since 2001. It is remarkable that the Japanese visitors increased in 2004. It is also observable from the regression result above that under the national Korean boom the Yonago-Seoul flight has the potential to attract more Japanese users because the coefficient of x_1 is higher than 1, showing one percent increase in the number of Japanese visitor to Korea implies more than 1 (namely, 1.13) percent increase in the number of user of Yonago flight.

As one of the explanatory data, we used the users of Okayama-Seoul international flights at Okayama Airport, in

order to see if the airport bus subsidy policy of Tottori Prefecture has some effects on the usage of the closest airport of Okayama. However, the variable does not show any significance on the Japanese users of Yonago flight. It shows the bus-subsidy policy cannot attract potential users in Okayama effectively.

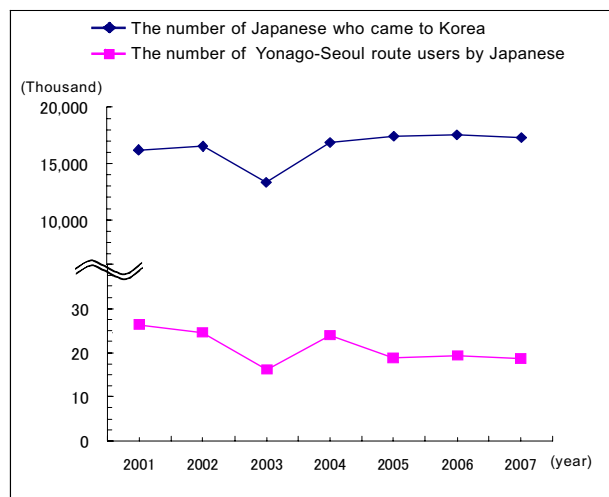


Figure 2. Japanese and Korean visiting to partner country since 2001

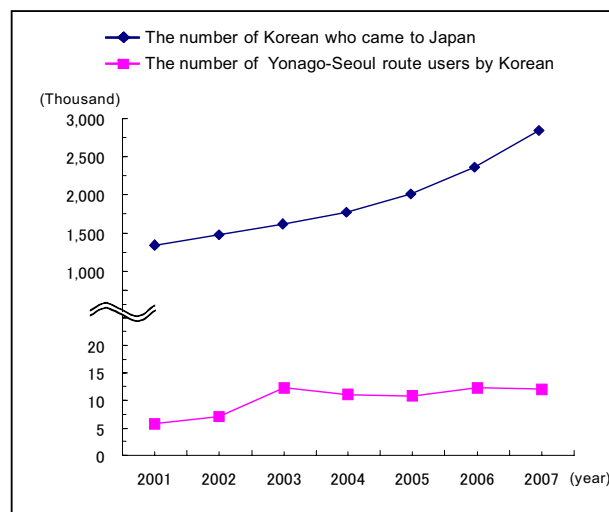


Figure 3. User of Yonago-Seoul flights and total Koreans visiting to Japan

C. Regression Analyses for Korean Tourists

For the regression of Korean visitors, the explanatory data of b), d), e), f), g), i), j), k), and l) are used. The resulting equation is given as follows.

$$\ln y = 2.81948^{**} \ln x_1 - 1.378144^{**} \ln x_2 + 0.1423819^* \ln x_3 - 14.2897183^{**} \quad (7)$$

where y is the number of Korean users of Yonago-Seoul international flight, x_1 is the Korean GDP, x_2 is the oil price,

and x_3 is Expenditure for Attraction Project of Foreign Tourists. The upperscript of ** on each coefficient shows 5% significance while * indicates 10% significance.

The Attraction Project of Foreign Tourists has some effects in increasing Korean visitors. It is also shown that the Korean users of the Yonago flight are affected by external economic factors such as Korean GDP and oil price.

Fig. 3 shows the Yonago-Seoul flight and overall Koreans visiting to Japan. While the total number of Koreans visiting to Japan has increased, Korean users of Yonago airport has not increased at a similar pace with the overall Korean increase. The promotion of Korean tourists seems to have some more potential to explore.

D. Economic Effects of Policies

For each regression analysis of the Japanese and Korean users of the Yonago-Seoul flight, one policy variable was left with reasonable significance which is Expenditure for Executives for User Promotion of Yonago-Seoul International Scheduled Flight for Japanese users. Its coefficient is 0.306. For Korean visitors, it is Expenditure for Attraction Project of Foreign Tourists, and its coefficient is 0.142.

Because both regressions are based on a log-linear function, these coefficient values show the 'elasticity' of the corresponding variable (user number).

First, consider the Expenditure for Executives for User Promotion of Yonago-Seoul International Scheduled Flight. The total expenditure in 2007 is 39,000,000 yen. So 1% of this is 390,000 yen. Therefore, the increase in 1% of this expenditure, namely 390,000 yen, brings about the increase in the Japanese travelers as follows:

$$\Delta y_1 = \left(\frac{0.3058008}{100} \right) \times y_1 \quad (8)$$

where Δy_1 is the increase in the Japanese travelers of Yonago-Seoul flights, and y_1 is the current Japanese travelers of Yonago-Seoul flights. The value of y_1 is given as 18,615 for year 2007, we get $\Delta y_1 = 56.92$. Also, as we already mentioned in the previous section, the cost/time saving benefit of the flight for Tottori Prefecture per traveler is $B = 10,268$ yen. Consequently, the marginal benefit of the 1% increase in the expenditure brings about an increase in the benefit of $B \Delta y_1 = 20,536 \cdot 56.92 = 584,504$ yen.

On the other hand, Expenditure for Attraction Project of Foreign Tourists in 2007 is 10,980,000 yen. 1% of that is therefore 109,800 yen. Because the corresponding coefficient is 0.1423819, the marginal increase in Korean traveler by the 1% increase in this expenditure is given as:

$$\Delta y_2 = \left(\frac{0.1423819}{100} \right) \times y_2 \quad (9)$$

where Δy_2 is the increase in the Korean users of Yonago-Seoul flights, and y_2 is the current Korean visitors using Yonago-

Seoul flights. The value of y_2 is given as half of the total users of the Yonago flight of 12,046 for year 2007, we get $\Delta y_2 = 8.58$. Also, as we already mentioned in the previous section, the economic benefit of one Korean visitor is 58,406.4 yen. Consequently, the marginal benefit of the 1% increase in the expenditure brings about an increase in the benefit of $58,406.4 \cdot 8.58 = 501,127$ yen. The 10,980,000 yen input for this expenditure eventually causes about 500,000 yen benefit to Tottori Prefecture.

V. CONCLUSIONS

Through the analyses based on a Nash bargaining model, we show that the actual bargaining result is close to the theoretical one, and the bargaining was 'not bad' for Tottori Prefecture given that it is not familiar with such economic bargainings and negotiations. It is, however, forecasted from our study that in 2010, with a decrease in the flight usage, the bargaining result can be an 80% user target rate and the total payment to be made by Tottori Prefecture might be over 100 million yen or one million US\$. The regression analyses show that the current two promotional policies are effective, and therefore continuous efforts for the policies should be appreciated.

The international scheduled flight enters its 9th anniversary in April 2009, but nothing has been yet announced by Asiana Airlines except for the tentative continuation of the first half of the year of 2009. With various efforts by Tottori including private companies, the average user rate of the flights is over 60% in 2008, a user rate greater than 60% has not been achieved for the last four years. However, with these tremendous efforts, the user rate is still below 70%, which is what the carrier indicates as the continuing level of usage for sustainable flight service. From previous experiences in Japanese airports, once a flight has discontinued its service, the service rarely comes back again to that airport. It is, therefore, important for Tottori Prefecture, with data collection and their analyses, to design and then carry out an effective and sustainable policy package including its target usage rate subsidy policy. The more effective implementation of the two promotion policies that are shown to be significant in the regression analyses is one of the promising ways of support expansion.

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