Effect on Taiwanese Hospitality Industry of Opening Taiwan to Mainland Chinese Tourists: A Case Study on Japanese Tourists

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Abstract

This paper focuses on whether the policy of opening Taiwan to mainland China tourists negatively affected the intention of Japanese tourists to stay at international tourist hotels in Taiwan. Adopting an empirical approach, the study first establishes a forecasting model for the number of Japanese tourists who stay at international tourist hotels in Taiwan using the auto-regression method. Then, the number is estimated using Monte Carlo simulation. The subject is international tourist hotels in Taiwan that primarily receive Japanese tourists, and the study period is from 2001 to 2013. The empirical results indicate that opening Taiwan to mainland Chinese tourists had a significant impact on Japanese tourist intention and behavior with respect to staying at international tourist hotels in Taiwan. However, the significant impact only occurred during the initial implementation period of the opening-up policy. For the remainder of the study period, Japanese tourism was not negatively affected but exhibited an increasing trend.

Keywords: Mainland Chinese tourists, Tourism policy, Monte Carlo simulation, International tourist hotel
JEL Classification Number: C23, E24, N35, L22

1. Introduction

Because the economic recovery of the United States and Europe has fallen short of expectations, emerging countries in Asia-Pacific region have not only become the primary impetus of the global economic recovery but the tourism markets of these countries have also become a focus of global attention. According to the Annual Report of China Outbound Tourism Development, the outbound tourism population reached 70.25 million in 2011, which is 1.2 times that of the United States and 3.5 times that of Japan. In 2012, the population of Chinese outbound tourists is expected to be 78.4 million, with outbound tourism consuming $80 billion, which would make China the world's largest exporter of tourists. In addition, based on the data released by the World Travel and Tourism Council (WTTC), the direct contribution of the tourism industry to the global GDP increased by

approximately 3% in 2011, which directly created 1.2 million new jobs. Moreover, in the next 10 years, the tourism industry is estimated to increase by 4% annually on average with a total scale of approximately 10% of the global gross domestic product (GDP) (equivalent to $10 trillion). In 2022, the employment population in the tourism industry or related industries could reach approximately 328 million individuals worldwide. On average, one in 10 jobs will be related to tourism[1]. Many studies on the tourism industry observe that the industry has a positive impact on a country's economic development, particularly in terms of foreign exchange earnings, the employment rate and tax income (Gunduz & Hatemi-J, 2005; Kim, Chen & Jang, 2006; Lee & Hung, 2010).

To strengthen cross-strait relations and promote economic development, Taiwan agreed to the "Opening Taiwan to Mainland Chinese Tourists" policy with China in October 2008. According to statistical data from the Taiwan Tourism Bureau, a large number of mainland Chinese tourists has brought many tourism benefits to Taiwan since the opening-up in 2008. Similarly, a number of scholars have stated that after Taiwan was opened to mainland China, the number of tourists from various countries did not decrease because of the opening-up policy but increased. An empirical study by Lee and Chou (2013) noted that after the policy's implementation, the population of tourists from various countries did not decrease overall. On the contrary, the opening-up policy might have resulted in substantial business opportunities that stimulated the tourism industry to spontaneously increase investment and adjust its scale, which in turn promoted the improvement of Taiwan's tourism industry and increased the number of tourists.

However, with the tourism industry flourishing, Taiwan must face the negative impacts that are likely to accompany this prosperous development[2], including mainland Chinese tourists remaining in the country illegally, the destruction of the natural environment and natural resources, a decrease in tourism service quality and the exclusion of international tourists[3]. Several scholars note that the opening of cross-strait tourism may affect the intention of tourists from other countries to visit Taiwan. For example, Fan (2009) expressed a reserved attitude toward the policy of opening Taiwan to mainland Chinese tourists, indicating that the travel behavior of mainland Chinese tourists may cause the service quality of local tourist attractions to decline, which might generate negative effects, such as the exclusion of other customer groups. The empirical results of Su et al. (2012) indicate that although the overall number of tourists to Taiwan has increased since the implementation of the opening-up policy in 2008, there has been a significant exclusion of Japanese and American tourists.

Today, most research on the policy of opening Taiwan to mainland Chinese tourists has focused on issues such as the policy's legal aspects, national security issues (Fan, 2006, 2010; Tsai, 2008), the operational efficiency of related industries, post-implementation impacts (Chang, 2009; Wang and

[1] According to the data released by the World Travel and Tourism Council (WTTC) to global tourism research centers, the global tourism industry accounted for approximately 9% of global GDP in 2011 (equivalent to US $6 trillion), and the related employment population was approximately 255 million individuals.

[2] Mathieson and Wall (1982) noted that tourism primarily affects three areas: economics, the physical environment and social culture.

[3] Because the production and the consumption of tourism products occur simultaneously, when Chinese tourists consume Taiwanese tourism products, it is possible that other tourists are also consuming such products at the same time and in the same space, which might produce the exclusion phenomenon between the groups.

Wen, 2010; Kao and Dai, 2011) and the consumption behavior of mainland Chinese tourists (Chen et al, 2004). Little research has been conducted on the impact of the opening-up policy on existing international tourist hotels or related topics. Because businesses in the tourism industry use the low-cost strategy to attract more customers and new businesses continue to join the industry in the search for market opportunities, the actual number of mainland Chinese tourists who stay at international tourist hotels is limited, despite the large number of such tourists who visit Taiwan. In addition, in light of current academic empirical studies, we could not determine whether the Taiwanese government's opening-up policy would crowd out tourists from other countries and thereby affect the population of international tourists who stay at Taiwanese international tourist hotels.

We use the auto-regression method to establish a forecasting model to predict the number of international travelers who would choose to stay at an international tourist hotel in Taiwan. Additionally, we estimate the population of international tourists in Taiwan before the opening-up policy using Monte Carlo simulation and compare the result with the number of international tourists who have stayed at international tourist hotels in Taiwan since the policy was implemented to determine whether such hotels have been affected since the policy took effect. The contributions of this paper include the use of auto-regression analysis to establish a forecasting model and the use of Monte Carlo simulation to forecast the population of international tourists who stay at international tourist hotels in Taiwan to evaluate the crowd-out effects of the policy of opening up Taiwan to mainland Chinese tourists on the population of international tourists who stay at international tourist hotels in Taiwan. The findings can serve as a reference for government agencies and policy makers.

The remainder of this paper is organized as follows. Section 2 briefly introduces the inbound tourism forecasting models. Section 3 focuses on the testing methods, including the unit root test, linear estimation and forecasting performance, and presents the empirical results. Conclusions are presented in Section 4.

2. Model and Method

To assess the number of Japanese tourists who stay at international tourist hotels in Taiwan, we first construct a linear auto-regressive (AR) forecasting model. Then, we introduce predictive performance indicators to measure the merits and demerits of the model assessment methods. Finally, we explain how to conduct the evaluation in this study using Monte Carlo simulations.

2.1 Linear AR Forecasting Model

The linear AR forecasting model, which predicts the number of Japanese tourists who stay at international tourist hotels in Taiwan, is explained as follows:

$$TR_t = \beta_0 + \sum_{i=1}^{n} \beta_i TR_{t-i} + \mu_t \qquad (1)$$

TR_t represents the number of Japanese tourists who stay at international tourist hotels in Taiwan, β_0 is the intercept, β_i is the estimated parameter, TR_{t-i} represents the lagged term for the number of Japanese tourists who stay at international tourist hotels in Taiwan, n is the optimum lag period and

is determined by the minimum of the Akaike information criterion (AIC), and μ_t represents the residual term.

2.2 Accuracy Criteria

The accuracy of a forecasting method is determined by analyzing the forecast error, which is defined as the actual value minus the forecast (or fitted) value of the variable for time period t. Yokum and Armstrong (1995) proposed that accuracy must be the most important criterion when the evaluation criteria for prediction methods are selected. Prediction accuracy is the difference between the predictive value gained from a forecasting model and the actual value, i.e., the prediction error. This measure is used to determine whether a forecasting model is successful. This paper adapts three predictive performance indicators to measure the predicted value and the actual value differences, including the root mean square error (RMSE), the mean absolute percentage error (MAPE) and Theil's inequality coefficient (Theil's U). The indicators are defined as follows:

$$RMSE = \frac{1}{n}\sqrt{\sum_{t=1}^{n}(F_t - A_t)^2} \tag{3}$$

$$MAPE = \frac{1}{n}\sum_{t=1}^{n}\left|\frac{(F_t - A_t)}{A_t}\right| \tag{4}$$

$$U = \frac{\sqrt{\frac{1}{n}\sum_{t=1}^{n}(F_t - A_t)^2}}{\sqrt{\frac{1}{n}\sum_{t=1}^{n}(F_t)^2}\sqrt{\frac{1}{n}\sum_{t=1}^{n}(A_t)^2}} \tag{5}$$

where F_t and A_t represent the forecast value and the actual value at time t.

For RMSE, the closer that its value is to zero, the better the predictive ability. The primary purpose of MAPE is to measure the part of the mode that has not been explained. The lower that the MAPE value is, the better the predictive ability of the forecast mode and the closer that the forecast result will be to past data. Lewis (1982) adopted the MAPE value to define four levels of predictive ability: highly accurate (less than 10%), excellent (between 10% and 20%), acceptable (between 20% and 50%) and incorrect (more than 50%). In terms of the relative error, Theil's U aims to obtain the minimum of every prediction error value instead of measuring based on the average of prediction differences. Thus, the smaller Theil's U value is, the smaller the sum of prediction errors and the better the model's predictive ability. The U value ranges from zero to one. A U value that is closer to zero indicates a more nearly perfect prediction of the forecast. A U value that is closer to 1 indicates the degree to which the forecast value differs from the actual value.

2.3 Inbound Tourism Estimation Method

The Monte Carlo simulation covers a variety of influencing factors and all possible conditions. In addition, it can solve the problem of possible non-estimable situations and reduced reliability when

the historical simulation method and time-series data are incomplete. Therefore, we selected this method to simulate and evaluate the number of tourists from various countries who visit Taiwan. The estimation procedure is as follows:

First, based on the parameters of the historical data estimation model, the stepwise regression method and the minimum AIC, we determine the optimal lag periods that significantly influence the number of Japanese tourists who stay at Taiwan international tourist hotels. Second, we determine the simulation parameters according to the distribution patterns obtained by the forecasting model residuals that predict the number of Japanese tourists who stay at Taiwan international tourist hotels. Finally, we extract 10,000 residual random number sequences and insert the sequences of the model into this mode. Then, we can estimate the number of Japanese tourists who stay at Taiwan international tourist hotels outside our samples.

3. Empirical Results

3.1. Data Description

This paper examines as empirical objects six international tourist hotels in Taiwan whose primary clientele consists of Japanese tourists. The time series is 1996-2013, whereby 1996-2006 is within the sample estimation period, 2007-2008 is a forecasting period outside the sample, and 2009-2013 is the estimation period. The data were collected from the Taiwan Tourism Bureau.

3.2 Unit Root Tests

The use of non-stationary variables for regression analysis in an empirical process may generate problems of spurious regression (Granger and Newbold, 1974). Therefore, before the model is applied in the empirical process and to ensure the constant nature of the information, we use one type of unit root test: the augmented Dickey-Fuller (ADF), which is frequently employed in the literature to determine whether variables match sequences of stationarity. The test results are shown in Table 1. According to Table 1, all of the data match with sequences of stationarity, and we can continue the follow-up analysis with the estimation results.

Table 1 ADF Unit Foot Test for the Number of Japanese Tourists Who Stay at Each Sample International Tourist Hotel

Hotel Name	Level			
	Intercept and Trend	ADF Statistics	Lagging Period	AIC
Ambassador	C	-4.292**	1	21.122
Gloria Prince	C	-4.756***	0	19.024
Emperor	C	-3.126*	1	18.216
Santos	C+T	-4.031	1	21.495
Royal-Nikko Taipei	None	-8.323	1	19.041
Regent Taipei	C	-5.213	1	21.546

3.3 Linear Estimation and Test

After the variables were verified as steady-state sequences, we choose the AR model as the linear model to predict the number of Japanese tourists who stay at Taiwan international tourist hotels. Considering that the occurrence of deferred effects of the number in the earlier stage would not exceed four quarters and to avoid the inadequacy of samples, the model's explanatory variable—the largest lag period—is set as 4 (i.e., m = 4). Then, we screen and select each sample hotel's optimal explanatory variable using the stepwise regression method. We use the p-value to identify the significant lag period and determine each sample hotel's optimum AR model based on the minimum AIC. The estimation results are shown in Table 2. According to the estimation results in Table 2, all of the coefficients of the optimal lag period that affect the tourism demand variable are significantly different from zero. Except for the Emperor Hotel, the other hotel residuals exhibit no self-relevance. Additionally, all of the hotel residuals are homogeneous variations and consistent with normal distribution.

Table 2 Results of Auto-regression Models

	Ambassador Hotel	Gloria	Emperor
β_1	1.10***		1.633***
β_2		0.799**	-0.841**
β_3		0.125	0.147
β_4			
Q(4)	7.8546 (0.346)	3.582 (0.466)	13.286 (0.010)
ARCH(4)	3.870 (0.8609	0.019 (0.904)	3.075 (0.374)
JB	0.531 (0.767)	0.768 (0.681)	0.523 (0.770)
Logl	-92.352	-44.341	-49.750

Notes: The numbers in parentheses are p-values. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively. Q(4) is the lagged 4-period Q statistic for testing the residuals without autocorrelation. ARCH(4) is the lagged 4-period F statistic for testing the residuals without heteroskedasticity. JB is the Jarque-Bera statistic for testing the residuals with normal distribution. Logl is the maximum likelihood value of the estimation model.

Table 2 Results of Auto-regression Models (continued)

	Santos	Royal-Nikko Taipei	Regent
β_1			0.916***
β_2		1.127***	
β_3			
β_4	0.886***		0.079
Q(4)	2.727 (0.605)	2.956 (0.565)	3.552 (0.470)
ARCH(4)	0.669 (0.575)	0.417 (0.585)	0.099 (0.769)
JB	0.168 (0.919)	1.768 (0.413)	0.742 (0.690)
logl	-128.235	-57.267	-71.323

Notes: The numbers in the parentheses are p-values. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively. Q(4) is the lagged 4-period Q statistic for testing the residuals without

autocorrelation. ARCH(4) is the lagged 4-period F statistic for testing the residuals without heteroskedasticity. JB is the Jarque-Bera statistic for testing the residuals with normal distribution. Logl is the maximum likelihood value of the estimation model.

3.4 Forecasting Performance

After the AR model estimation is complete, we evaluate the performance of the forecasting model. This study uses the RMSE value, the MAPE value and the Theil's U value as the criteria to evaluate the model's predictive performance. The first and second quarters of 2008 are the outside-sample performance evaluation period. The estimation results are shown in Table 3. According to Table 3, the MAPE values of all of the sample models are less than 50. That is, all of the forecasting models are acceptable. The predictive ability of the Regent Hotel model is highly accurate, and the Ambassador Hotel and Gloria Prince Hotel models have excellent predictive power. In addition, according to the Theil's U value, the sample models with better predictive performances are the Regent Hotel, the Ambassador Hotel and the Gloria Prince Hotel.

Table 3 Forecasting Model Performance

	RMSE	MAPE	Theil
Ambassador	13,040	10.991	0.062
Gloria Prince	5,089	15.263	0.097
Emperor	5,995	27.527	0.242
Santos	20,718	25.502	0.176
Royal-Nikko	26,878	37.523	0.299
Regent Taipei	10,386	3.883	0.051

3.5 Estimation Results

After the predictive performance evaluation is complete, we use Monte Carlo simulation to simulate the residual distribution of the forecasting model of the number of Japanese tourists who stayed at Taiwan international tourist hotels from 2009 to 2011 and to further estimate the number of Japanese tourists who stay at Taiwan international tourist hotels. The estimation results are shown in Table 4. According to Table 4, in terms of the overall number of Japanese tourists who stay at Taiwan international tourist hotels, for all of the sample hotels, the number significantly decreased during the initial stage of the implementation of the policy to open Taiwan to mainland China tourists. However, this result only occurred during the first two years of the opening-up policy. After the third year following the policy's implementation, all of the sample hotels experienced an increase in the number of Japanese tourists in their hotels. A possible explanation for these results is the exclusion of Japanese tourists when large numbers of mainland China tourists visited Taiwan during the early stage of the opening-up policy. The empirical results of Su et al. (2012) indicate that since Taiwan opened to tourism from mainland China in 2008, mainland Chinese tourists have significantly crowded out Japanese and American tourists, although the overall number of tourists to Taiwan increased.

Table 4 Actual and Predicted Number of Japanese Tourists Who Stay at Each Sample Hotel

	Ambassador	*Ambassador**	Gloria	*Gloria**
2009	85,209	*100,732*	23,226	*26,362*
2010	98,025	*101,726*	26,901	*25,064*
2011	111,208	*102,731*	27,039	*24,628*
2012	124,262	*103,746*	32,331	*23,410*
2013	114,913	*104,770*	28,544	*22,984*

Note: * is the estimated number of Japanese tourists who stay at each international tourist hotel according to the forecasting model.

Table 4 Actual and Predicted Number of Japanese Tourists Who Stay at Each Sample Hotel (continued)

	Emperor	*Emperor**	Santos	*Santos**
2009	14,361	*13,719*	52,267	*67,037*
2010	11,394	*11,612*	54,732	*59,418*
2011	13,073	*9,752*	57,997	*52,665*
2012	14,435	*8,167*	73,080	*46,680*
2013	18,188	*6,834*	75,735	*41,375*

Note: * is the estimated number of Japanese tourists who stay at each international tourist hotel according to the forecasting model.

Table 4 Actual and Predicted Number of Japanese Tourists Who Stay at Each Sample Hotel (continued)

	Royal-Nikko Taipei	*Royal-Nikko Taipei**	Regent	*Regent**
2009	_	*26,609*	99,823	*104,605*
2010	29,245	*31,106*	96,026	*104,998*
2011	55,228	*29,992*	105,516	*105,242*
2012	72,197	*35,060*	113,768	*104,623*
2013	63,305	*33,806*	85,369	*104,137*

Note * is the estimated number of Japanese tourists who stay at each international tourist hotel based on the forecasting model.

4. Conclusion

The policy of opening up Taiwan to mainland Chinese tourists is one of the most important tourism policies issued by Taiwan's government. However, the sudden influx of a large number of mainland Chinese tourists is bound to place a burden (i.e., transportation, accommodation, staff) on the tourism industry in Taiwan. In addition, whether the long-term negative evaluation of mainland Chinese tourists in international public opinion indirectly decreases the intention of tourists from other countries to visit Taiwan and thus affects the number of international tourists who stay at

Taiwanese international tourist hotels is currently the focus of the Taiwanese government and Taiwan's tourism industry. To improve our understanding of the effects of the government's opening-up policy on Taiwan international tourist hotel industry, this paper constructs a forecasting model to predict the number of Japanese tourists who stay at Taiwan's international tourist hotels. Monte Carlo simulation is used to estimate the number of tourists from various countries who stayed at Taiwan international tourist hotels before the opening-up policy was implemented to determine whether the opening-up policy affects the intention of international tourists to visit Taiwan and to assess the affect the number of tourists who stay at international tourist hotels in Taiwan. The empirical results are summarized as follows.

First, during the initial stage of the implementation of the policy, the number of Japanese tourists who stayed at Taiwan international tourist hotels significantly decreased. However, this decrease only occurred during the initial period following the introduction of the policy. For the remaining study period, the number was not negatively affected but displayed an increasing trend. A possible explanation for these results is the exclusion of Japanese tourists when large numbers of mainland Chinese tourists visited Taiwan during the early stage of the opening-up policy. On the one hand, the negatively assessed behavior of mainland Chinese tourists was continually noted in the international arena and in fact negatively affected the intention of international tourists to visit Taiwan. On the other hand, Taiwan's tourism industry spontaneously increased investment and adjusted its overall scale in response to the substantial opportunities created by the opening-up policy. The policy not only encouraged Taiwan's tourism industry to upgrade but also offset the negative effects that were possibly generated by the opening-up policy. Thus, additional Japanese tourists were attracted to tour Taiwan, and the number of Japanese tourists who stay at Taiwan international tourist hotels increased.

Finally, opening Taiwan to mainland Chinese tourists helped develop Taiwan's tourism industry and has been helpful with respect to domestic economic development to a certain extent. However, the large numbers of tourists and the variable character of tourist behavior may damage well-known domestic attractions and Taiwan's natural environment. In addition, to compete for and pursue the substantial business opportunities that have appeared since the opening-up policy was implemented, a number of businesses in the industry have adopted the low-cost strategy to attract mainland Chinese tourists. Several businesses even risk financial loss by eliminating tour guide fees with the hope of recouping the cost through shopping commissions. However, if the economy were to experience severe fluctuations or if cross-strait policies were to change, tourism-related industries would face substantial operational difficulties, which may result in systemic risks. Therefore, to prevent possible risks, the government should establish a comprehensive package of measures for the operation and management of relevant industries.

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