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ECONOMIC EFFECTS FROM CHANGE IN TOURISM POLICY ON AN ISLAND ECONOMY

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ABSTRACT

Taiwanese government adjusted its tourism policy toward Chinese people in 2008, hoping it would enhance its economic prosperity and create the employment. Motivated the economic effects generated by the relaxation of the policy were unclear, we have employed both the industry-related spillover model to examine the economic scale and the number of persons employed created, and to investigate the extent of the effect. Our findings were that the economic spillover effects were brief and transient. Nonetheless, it could overcome Taiwan's economic challenges. Only through the sustainable management of the tourism-related industry could long-term economic effects be created.

KEYWORDS: Tourism Policy Adjustments, Aviation Deregulation, Industry-Related Spillover Model, Spillover Effect, Employment Coefficient

JEL: H29, R28, R38

INTRODUCTION

C hina has been reforming and opening up its economy since the mid-1970s, attracting a great amount of international capital. China's annual economic growth rate has surpassed 10%, which is the second to that of the United States. It has already become the world's second largest economy. As its economy has grown, the income of the Chinese people has increased significantly, and the number of Chinese people traveling abroad has increased. The vigorous purchasing power of the Chinese people has drawn substantial amounts of international attention. Currently China has the fastest growing number of international tourists. According to a study by the China Tourism Academy, 65 million Chinese people left the country for traveling during 2011, spending more than US$50 billion for tourism. The China Tourism Academy estimated that the number of international tourists would continue growing up to 78.4 million in 2012, with traveling expenditure reaching US$80 billion.

There are divergent political opinions between China and Taiwan. In the past, Taiwan's traveling policies toward Chinese people have been relatively conservative, substantially restricting the tourism activities of Chinese citizens coming to Taiwan. In spite of this, China and Taiwan have close economic connections. More than 40% of Taiwanese export is dependent on the Chinese market. Beyond our general understanding, Taiwan's economic development is currently restricted by growth in China. Despite the close economic and trade relationship between Taiwan and China, Taiwan has not always been open to Chinese tourists. Generally speaking, Taiwan became open to visiting from Chinese professionals in 1991. There are people with doing economic, athletic, religious and trade exchange activities. Beginning on January 1, 2002, Taiwan has gradually opened up to Chinese exchange students, Chinese citizens living abroad or overseas with permanent local residency, and Chinese citizens traveling overseas for tourism or business visiting and transferring to Taiwan for their tourism. Taiwan did not issue tourist visas to general Chinese citizens until the Taiwanese presidential election of March 2008, withdrawing traveling restrictions and broadening the range of tourism permitted in Taiwan. On December 15, 2008, Taiwan and

China jointly agreed to change their transport policies. During the first phase of aviation deregulation in 2009, China and Taiwan respectively opened 16 and 8 designated cross-strait direct flight routes, including 36 flights per week. In the second phase of aviation deregulation in 2010, the number of designated routes and weekly flights was expanded to 31 and 370, respectively. The third phase of aviation deregulation in 2011 entailed permitting individual visits to Taiwan for Chinese tourists. Concurrently, the number of designated direct routes was extended to 37 and the weekly flights were increased to 540. In the fourth phase of aviation deregulation in 2012, the number of direct routes was enlarged to 46 and the weekly flights were amplified to 616, which fulfilled the Economic Cooperation Framework Agreement(ECFA) that China and Taiwan signed and facilitate cross-strait travel. Table 1 indicates that the number of departures and arrivals of Taiwanese international airlines has gradually decreased after aviation deregulation; however, the number of departures and arrivals of cross-strait airlines has increased annually. A similar

Table 1: Number of International Airlines from 2007 to 2012

Year	International Airlines (Including Hong Kong and Macao	Cross-strait Airlines (Taiwan–China)	International Airlines (Including Hong Kong and Macao	Cross-strait Airlines (Taiwan–China)	International Airlines (Including Hong Kong and Macao	Cross-strait Airlines (Taiwan–China)
	Number of Departures and Arrivals		Tourists(Persons)		Cargo Transport Volume (ton)	
2007	192,610	-	24,431,735	-	1,191,117.64	-
2008	172,469	2,279	22,784,144	418,689	1,033,835.03	1,516.86
2009	149,131	17,741	19,989,679	3,105,867	866,711.17	66,274.22
2010	155,500	33,823	21,910,463	5,826,153	1,017,700.86	146,240.12
2011	160,775	44,562	21,936,344	7,157,484	951,820.24	156,826.26
2012	171,610	58,513	23,923,825	8,943,281	930,654.50	171,423.25
2009/2008	0.86	7.78	0.88	7.42	0.84	43.69

Note: The data is compiled by the Taiwanese Tourism Bureau.

phenomenon is reflected in the trends of international and cross-strait tourism. In Taiwan, the numbers of international-airline departures and arrivals and international tourists decreased by 14% and 12% from 2008 to 2009, respectively; conversely, the numbers of arrivals and departures of cross-strait airlines and cross-strait tourists in 2009 increased 7.78 times and 7.42 times, respectively. By comparison, the change in the cross-strait cargo transport volume was greater. The cross-strait cargo transport volume in 2009 was 43.69 times that in 2008. These figures demonstrate the substantial impact of cross-strait aviation deregulation on tourist numbers and airfreight transport. Those policy adjustments had two goals: the first was to broaden the exchange activities between the people of Taiwan and China, and the second was to create economic benefits for Taiwan. In September 2008, the Lehman Brothers investment bank in the United States filed for bankruptcy and triggered a global financial crisis. It was a severe blow to the Taiwanese economy. Those international economic disturbances accelerated the relaxing of tourism policy toward Chinese people.

According to the statistical data from the Taiwan Tourism Bureau, during the first quarter of 2010, the amount of Chinese tourists visiting Taiwan was already greater than those from other countries. China has become the main source of international tourists in Taiwan. In June 2011, the restrictions toward Chinese people were relaxed once again, with allowing Chinese citizens arriving for individual or personal tourism coming to the island. As the amount of Chinese tourists to Taiwan increases and tourism types diversify, Taiwanese people have had numerous evaluations of and expectations toward the benefits brought by Chinese tourists in Taiwan. The information disseminated by various organizations has resulted in differing claims on and expectations for the economic benefits brought to Taiwan by Chinese tourists.

Prior studies been devoted on the impact of relaxing in Taiwan tourism policy toward the Chinese people on its economy have focused primarily on tourism image, motivation, satisfaction, and itinerary planning.

Additionally, there is also a limited literature investigating the socio-cultural and political levels. Few Studies documented on the effect of adjustment in Taiwan tourism policy to Chinese people on its economy. Motivated by the significant increase Chinese tourists in the overall Taiwanese tourism market and the lack of more complete empirical analyses in previous studies on the economic benefits created by Chinese tourism, we employ the industry-related spillover model to examine the effects of tourism policy adjustments to Chinese tourists on Taiwan's economy.

The economic growth driven by tourism is an attempt to transform Taiwanese policy. Therefore, the impact of the increase in Chinese tourists on the Taiwanese economy is becoming more obvious. In particular, it has had a significant impact on the development of the tourism-related industries. Our study addressed the questions: specifically, how large the adjustments to Chinese tourism policy have an impact on the Taiwanese economy and how much they could provide employment for Taiwan. There are few studies regarding these aspects. Therefore, we conduct an empirical study to obtain better understanding the impact of relaxing in tourism policy on the Taiwanese economy.

The remainder of the paper was organized as follows. Section 2 reviewed the relevant literature. In section 3, we discussed our empirical methodology. Section 4 reported the empirical results and the final section concluded with a brief summary.

LITERATURE REVIEW

China began allowing international traveling in 1983, with the residents of Guangdong being permitted to visit their relatives in Hong Kong. The relative-visiting policy was expanded throughout the entire country in 1984. Overseas relatives, however, were required to be responsible for traveling expenses. Thus, outbound traveling was limited. In 1990, China's foreign exchange policy was changed and Chinese people were allowed to engage in tourism at their own expense. The number of outbound tourists began to increase annually. Therefore, there is a growing body of work on the region during the late 1990s. The literature on Chinese outbound tourism focused on Asian regions, including Hong Kong, Singapore, Malaysia, and Thailand (Wang & Sheldon, 1996; Qiu & Qu, 1996; Qu & Lam, 1997; Cai *et al.*, 1999; Qiu & Lam, 1999). Those studies explored and compared the traveling behaviors and socioeconomic characteristics of Chinese tourists in Singapore, Malaysia and Thailand.

Starting with 2000, there is literature documenting on outbound traveling for China in related with the growth of Chinese economy. (Goh & Law, 2002; Kim *et al.*, 2005). Cai *et al.* (2001) and Jang *et al.* (2003) assessed the tourism goals of Chinese tourists in the United States. Becken(2003) indicated that the largest expenditure for Chinese tourists was made on transportation, followed by accommodation. Shopping was the largest personal consumption expenditure. The majority of outbound tourists believed that Hong Kong was a shopping paradise and shopping was the primary motivation for traveling to Hong Kong. Studies by the United Nations World Tourism Organization (UNWTO) examined the patterns of consumption and tourism markets for Chinese outbound tourists. UNTWO (2003) and UNWTO (2008) documented that shopping was the most popular activity or itinerary for Chinese tourists. More recently, Wang and Wen (2010) investigated the economic benefits brought by Taiwan's issuing or allowance of tourist visas for Chinese after 2008. Wang and Wen (2010) also argued that opening Taiwan tourism market toward Chinese tourists brought positive benefits for the Taiwanese economy. Within the two years right after liberalization, a total of NT$59.6 billion in tourism income had been generated.

Li *et al.* (2010) used an incidental target-market approach and proposed new results for this burgeoning market. The results of Li *et al.* (2010) indicate that approximate 22 million city residents from mainland China were the main origin of outbound travel markets, among which 11.5 million city residents had traveled or planned to travel to tourism regions except Asia. In addition, the study not only evaluates market size and makes recommendations on target cities but also presents an effective research design to identity target markets and customer positioning. Falk (2010) explored the relationship between the number of overnight stays and various measures of snow depth according to panel data including 28 Austrian ski resorts during the periods from 1986/87 to 2005/06 through the dynamic heterogeneous

panel data technique developed by Pesaran *et al.* (1999). Pesaran *et al.* (1999) provided the evidence that there was a long-run relationship between the number of overnight stays, amount of snow depth, weighted real GDP per capita of the major countries of visitor origin, and price index of accommodation services. Pesaran *et al.* (1999) also found that early Easter holidays were significantly and positively related to the demand of winter tourism.

Seetanah (2011) studied the potential contribution of tourism for economic growth and development within the conventional augmented Solow growth model by a panel data of 19 island economies for the years that span from 1990 to 2007.The results of this study reveal that the economic growth of island economies was significantly produced by tourism using generalized method of moments method. Seetanah (2011) also finds that tourism development on island economies could have comparatively higher growth effects on developing and developed countries through comparative analysis. Becken and Lennox (2012) proposed a global general equilibrium model with a purpose-built computable general equilibrium model of New Zealand, and it puts an emphasis on describing supply and demand of the tourism in some details. The results of Becken and Lennox (2012) presented a reduction in actual gross national disposable income of 1.7% for a doubling of oil price and a 9% decrease in the actual value of tourism exports. Moreover, the decrease in tourism demand in New Zealand resulted from segment-specific price increases and various income and exchange rate effects and elasticities. The greatest decrease of tourism demand was caused by the reduction of tourists from the United Kingdom.

Wan (2012) explored the social, economic and environmental consequences of casino gaming in Macao in 2002. The results of this paper show on the community impact of casinos, and provide management and policy implications for destination managers in Macao and other destinations with intentions to develop casinos and gaming-related tourism industry. Mitchell (2012) studied two issues: (1) the emergence of pro-poor tourism as an idea and (2) how the impacts of tourism on local communities around developing world tourist destinations can be measured. This study explains and identifies a research method to value chain approaches which allows researchers to "trace the tourism dollar" in tourist destinations of the developing country. The method with professional experience was indicated that the methodology based on empirical studies is conceptually robust and a practical way of alleviating poverty, and allows researchers and the industry to work and cooperate together effectively in 12 different developing country destinations.

Literature discussed above emphasizes the economic growth and consumption behavior pattern of Chinese overseas travel. Wang and Wen (2010) performed merely the assessment or estimation of preliminary economic effects. Previous studies were not capable of observing the effect of relaxing tourism policy to Chinese citizens on the overall Taiwanese economy. In the present study, we employ the industry-related spillover model and to evaluate or estimate the economic spillover effect created by adjusting a tourism policy. We also used the employment-created model to calculate the employment creation generated by these spillover effects.

Most previous literature studied on the effects for tourism industry in terms of the microeconomic analysis or on the initial macroeconomic evaluation. There is little detailed investigation on the service-related industry. The present study employed the industry-related spillover model, in which it could allow to study on the individual industry as well as to do the comparisons within the whole economy, to investigate the economic effects of a change in the tourism policy on industry-related tourisms. Therefore, researchers regard the industry-related spillover model as a mezzo (macroeconomics) to examine the degree of interaction among the industries. In the present study, we focus on examining the economic effects of relaxing the tourism policy to obtain better understanding the current situation of the tourism industry and to provide the future direction in development of the tourism industry.

Liu *et al*. (2013) employed an industry-related spillover model and employment-created model to examine the economic impact of Chinese inbound tourists on the additional numbers of persons employed, and to investigate the extent of the effects on the tourism related industries. It is concluded that by 2011, the economic spillover effects for the retail sector and accommodations services sector were US$773.49

million and US$438.43 million, respectively. The total spillover effect of US$7,617 million accounted for 0.183% of Taiwan's GDP. Li *et al.* (2013) and Chien *et al.* (2014) found that the employment coefficient, the ratio of earning share, and final demand production inducement dependency are the key factors among the determinants causing the difference in spillover effect between the hospitality and restaurant industries. Hong *et al.* (2014) found that based on the economic spillover effect arising from the aviation deregulation, tourism consumption from Chinese tourists would be crucial to the island economy in future. Taiwan's economy would not be only trade-dependent on China, but also expanding to rely on Chinese tourists' consumption. Lo *et al.* (2014) based on the models established by Leontief (1966) and Miyazawa(2002) and by adding the effective tax rate, which is employed by the Japan National Tourism Organization (2010), the present study measures the indirect tax, the personal income tax, and the corporate income tax resulting from the change in the transport policy. This allows us to get better understanding the tax effects of the change in a transport policy. The empirical results show that the total tax revenue of the aviation deregulation generated for US$1,047.3164 million, equivalent to the total tax revenue of 1.78% in 2011 in a small open economy. The indirect tax revenue, the personal income tax revenue and the corporate income tax revenue accounted for 0.76%, 0.81%, 0.21%, respectively. As for the industrial sector, the tax revenue from the service-related industry is US$939.7126 million, which accounts for up to 89.73% of the total tax revenue under the aviation deregulation. Hong *et al*. (2014) by adding the effective tax rate to the industry-related spillover model showed the tourism spending generated significant tax revenue, accounting for 1.32% of the total tax revenue in 2011 in Taiwan. Chinese tourists' consumption greatly contributed to the island economy. It might imply Taiwan's economy or tax revenue would be not only trade-dependent on China, but it might also rely on the Chinese tourists' consumption.

MODEL DEVELOPMENT

In order to estimate the economic effects of Chinese tourists visiting Taiwan, Chinese tourists' spending content needs to first be defined. As assessing the employment effects generated by Chinese tourists on Taiwan, the employment coefficients of each industry should first be calculated. The estimation covers over the periods from the July 2008, as Taiwan relaxed its tourism policy toward Chinese citizens, to December 2011.According to the statistical data compiled by the Taiwanese Tourism Bureau, Executive Yuan, the number of Chinese tourists in Taiwan were 329,204(2008), 972,123(2009), 1,630,735(2010), 1,784,185(2011), 2,586,428(2012), and 2,874,702(2013). For spending patterns of Chinese tourists, the retail sector (for shopping expenditures) was the most substantial at 50.67% of the total amount. It was followed by accommodation services(29.15%), food services(6.68%), land transport (6.38%), and buying tea leaves(6.33%). Shopping is a priority for Chinese tourists. It is consistent with those of Cai *et al.*(2001), Jang *et al.*(2003), Becken(2003), UNWTO(2003), and UNWTO(2008). Our data were the average daily and total spending amounts for Chinese tourists in past years. We used an average travel time of five days as the calculation basis for total spending (according to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days).

Industry-Related Spillover Model

Based on the industries classified in the industry-related table as having closer relationships with tourists' spending, the tourism-related industries in the present study consist of food services, accommodation services, land transport, telecommunications services, insurance, travel services, arts, entertainment, and leisure services, and retail. In the present study, we estimate the total effects generated on the Taiwanese economy by Chinese tourists. We further investigate the impact for tourism-related industries and uncover the future developmental trends of the Taiwanese leisure and travel industries.

The industry-related spillover model is to estimate the extent of interdependence among the sectors. The spillover processes consist of direct and indirect effects. The indirect spillover effects might include the first, the second, and the third and so on. In the present study, we estimate the first two (Based on the results of the estimates of industry-related model, the third indirect spillover effect is gradually died out. It is trivial for the whole economy. In this study, therefore, we only obtain the estimate the direct, the first

and second spillover effects). We also focus on the industry-related spillover model of competitive import model instead of the competitive industry-related model based on the level of import inclined of the extent of domestic economic aggregate demand (The competitive industry-related model is modeled for the competitive relationship between imported commodities and domestic commodities) (Li, et al., 2013; Liu, et al., 2013; Chien, et al., 2014; Hong, et al., 2013; Hong, et al., 2014; Hong, et al., 2014; Hong, et al., 2014; Lo, et al., 2014).

The supply-demand equilibrium equation of the competitive import type of the industry-related spillover model could be constructed as

$$\sum_{j=1}^{n} x_{ij} + F_i^d + E_i = X_i + M_i, i = 1,2,\cdots n \tag{1}$$

where x_{ij} denotes the per output for industry j resulting from the input of industry i; is the amount of the domestic final demand for industry i and E_i is the amount of the export demand for industry i ; X_i is the amount of production for industry i ; M_i is the amount of import for industry i. We could then rewrite equation (1) to obtain the following,

$$\sum_{j=1}^{n} a_{ij} X_j + F_i^d + E_i = X_i + M_i, i = 1,2,\cdots n \tag{2}$$

where $a_{ij} = x_{ij}/x_j$; a_{ij} is the input coefficient which denotes the input from industry i per output for industry j (i = 1, …, n; j=1,2, …n); x_j represents the total output of industry j and x_{ij} stands for per output for industry j resulting from the input of industry i. The measure of import(M_i) is specified:

$$M_i = m_i(\sum_{j=1}^{n} a_{ij} X_j + F_i^d), i = 1,2,\cdots n \tag{3}$$

From equation (3), the import coefficient could be formulated as

$$m_i = {M_i}\Big/{(\sum_{j=1}^{n} a_{ij} X_j + F_i^d)}, i = 1,2,\cdots n \tag{4}$$

Combining equations (2) and (3), we obtained as follows

$$X_i - (1 - m_i)\sum_{j=1}^{n} a_{ij} X_j = (1 - m_i)F_i^d + E_i, i = 1,2,\cdots n \tag{5}$$

In terms of matrix, equation (5), which is the competitive import type of the industry-related spillover model, could be rewritten as

$$X = [I - (I - \overline{M})A]^{-1}[(I - \overline{M})F^d + E] \tag{6}$$

where A is the input coefficient matrix (n×n), A could be given

$$A = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix}; \tag{7}$$

I is the identity matrix; $\overline{M}$ represents the diagonal matrix of import coefficient (n×n), $\overline{M}$ is

$$\bar{M} = \begin{bmatrix} m_1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & m_n \end{bmatrix} \tag{8}$$

$I - \bar{M}$ stands for rate of Taiwan's self-supplying ; $I - \bar{M}$ is specified as

$$I - \bar{M} = \begin{bmatrix} 1 - m_1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & 1 - m_n \end{bmatrix}; \tag{9}$$

F^d deducted import from the aggregate expenditures is the matrix of Taiwanese final consumption and investment; E denotes the export vector (n×1) at period t, which is specified as

$$E = \begin{bmatrix} E_1 \\ \vdots \\ E_n \end{bmatrix} \tag{10}$$

$[I - (I - \bar{M})A]^{-1}$ is the Leontief inverse matrix, which is so called Leontief multiplier. It measures the extents of the direct and indirect spillover effects of the foreign tourists on the tourism-related industries Assume that there is no impact on Taiwan's export from the consumption of foreign tourists; the industry-related spillover model could be modified as

$$\begin{aligned}
X &= [I - (I - \bar{M})A]^{-1}[(I - \bar{M})F^d] \\
&= [(I - \bar{M})F^d] + (I - \bar{M})A[(I - \bar{M})F^d] + [(I - \bar{M})A]^2[(I - \bar{M})F^d] \\
&\quad + [(I - \bar{M})A]^3[(I - \bar{M})F^d] + \cdots \\
&= [(I - \bar{M})F^d] + (I - \bar{M})A[(I - \bar{M})F^d](I + [(I - \bar{M})F^d] + [(I - \bar{M})A]^2 + \cdots) \\
&= \underbrace{[(I - \bar{M})F^d]}_{\text{Direct Spillover Effects}} + \underbrace{[I - (I - \bar{M})A]^{-1}(I - \bar{M})A[(I - \bar{M})F^d]}_{\text{Indirect Spillover Effects}}
\end{aligned} \tag{11}$$

Let Leontief inverse matrix $[I - (I - \bar{M})A]^{-1}$ be Γ^*, equation(11) could be reformulated as

$$X = \underbrace{[(I - \bar{M})F^d]}_{\text{Direct Spillover Effects}} + \underbrace{\Gamma^*(I - \bar{M})A[(I - \bar{M})F^d]}_{\text{Indirect Spillover Effects}} \tag{12}$$

<u>Industry-Related Spillover Model</u>

Following equation (12), in the present study we would estimate the direct, the first, the second direct spillover effects. The measures could be constructed

<u>Measurement of the Direct and Indirect Effects</u>

<u>The Direct Effects</u>

The direct effect is the product of change in domestic final demand(δF_i^d) and rate of self-supplying($I - \bar{M}$), that is

$$(I - \bar{M})\delta F_1^d \tag{13}$$

The First Indirect Spillover Effects

Referring to equation (12), the first indirect spillover effect, which is the domestic induced amount of production (δX_1), is measured as

$$\delta X_1 = \Gamma^*[(I - \overline{M})\delta F_1^d] \tag{14}$$

The Second Indirect Spillover Effects

In order to measure the second indirect spillover effects, we calculate that the rate of income of the employed(W^L) measured by the ratio of the income of the employed(w_j^L) to the total input for industry $j(X_j)$ are

$$W^L = [w_1^L w_2^L \cdots w_n^L], w_j^L = \frac{v_j^L}{X_j} \ , j = 1,2,\cdots n \tag{15}$$

Combining equations (14) and (15), the induced income of the employed is

$$W^L \delta X_1 \tag{16}$$

The increase in consumption expenditure is

$$\overline{c}W^L \delta X_1 \tag{17}$$

where $\overline{c}$ denotes the Taiwan's average propensity to consumption in 2011

Therefore, the second change in increase in final demand for industry j is yielded

$$\delta F_2^d = C\overline{c}W^L \delta X_1 \tag{18}$$

where

$$C = \begin{bmatrix} c_1 \\ \vdots \\ c_n \end{bmatrix} \begin{bmatrix} F^d_{(c)1} \div (\sum_{k=1}^n F^d_{(c)k}) \\ \vdots \\ F^d_{(c)n} \div (\sum_{k=1}^n F^d_{(c)k}) \end{bmatrix} \tag{19}$$

Accordingly, the second indirect spillover effects could be measured as

$$\delta X_2 = \Gamma^*[(I - \overline{M})\delta F_2^d] \tag{20}$$

Total Economic Spillover Effects

Combined equations(13), (14) and (20), the formula that we could estimate the total economic spillover effects of the consumption expenditures from Chinese tourists on Taiwan's economy could be restated as

$$\underbrace{TESE}_{\substack{\text{Total Economic} \\ \text{Spillover Effects}}} = \underbrace{(I - \overline{M})\delta F_1^d}_{\substack{\text{Direct Spillover} \\ \text{Effects}}} + \underbrace{\Gamma^*[(I - \overline{M})\delta F_1^d]}_{\substack{\text{First Indirect} \\ \text{Spillover Effects}}} + \underbrace{\Gamma^*[(I - \overline{M})\delta F_2^d]}_{\substack{\text{Second Indirect} \\ \text{Spillover Effects}}} \tag{21}$$

The estimating procedures of industry-related spillover model could be demonstrated concisely as Figure 1.

Measurement of the Persons Employed

Plugging the rate of induced income of employment(W_j^L) and the rate of gross induced added value(W_j^G) into equation(21), the induced income of employment and the gross induced added value could be measured as follows:

$$W^G = [w_1^G w_2^G \cdots w_n^G], w_j^G = \frac{v_j^G}{x_j} \ , j = 1,2,\cdots n \tag{22}$$

where v_j^G is the gross added value in the industry j.

Plugging the rate of gross added value(w_j^G) in equation(22) into equation(21), The total gross induced added value(TV) is formulated as equation(23), consisting of the direct gross added value, the first and the second indirect gross added value.

$$\underset{\substack{\text{Total Gross Induced}\\\text{Added Value}}}{TV} = \underbrace{w_j^G(I-\overline{M})\delta F_1^d}_{\substack{\text{Direct}\\\text{Gross Induced}\\\text{Added Value}}} + \underbrace{w_j^G \Gamma^*[(I-\overline{M})\delta F_1^d]}_{\substack{\text{First Indirect}\\\text{Gross}\\\text{Induced Added Value}}} + \underbrace{w_j^G \Gamma^*[(I-\overline{M})\delta F_2^d]}_{\substack{\text{Second Indirect}\\\text{Gross}\\\text{Induced Added Value}}} \tag{23}$$

Combined equations(15) and (21), the formula for total induced income of employment(TE) that we could estimate the direct and indirect induced income of employment of the consumption expenditures from Chinese tourists on Taiwan's economy could be restated as

$$\underset{\substack{\text{Total Induced}\\\text{Income of}\\\text{Employment}}}{TE} = \underbrace{w_j^L(I-\overline{M})\delta F_1^d}_{\substack{\text{Direct}\\\text{Income of}\\\text{Employment}}} + \underbrace{w_j^L \Gamma^*[(I-\overline{M})\delta F_1^d]}_{\substack{\text{First Indirect Induced}\\\text{Income of}\\\text{Employment}}} + \underbrace{w_j^L \Gamma^*[(I-\overline{M})\delta F_2^d]}_{\substack{\text{Second Indirect Induced}\\\text{Income of}\\\text{Employment}}} \tag{24}$$

EMPIRICAL RESULTS

The empirical analysis in this section is divided into two sections. The first section presents the estimates of the overall economic spillover effects and the second section is to estimate the economic spillover effects in tourism-related industries. We use the employment coefficients of each industry to estimate the amount of persons employed created.

Spillover Effects

The results in Table 2 illustrate that the total spending of Chinese tourists in Taiwan as the initially relaxing tourism policy to Chinese people was US$295.60 million (direct effects). The first economic spillover effects added US$160.40 million and the second economic spillover effects increased the total figure to US$165.80 million. The domestically generated total economic spillover effects added a further US$440.22 million. Subsequently, following the rapid growth in Chinese tourist numbers, the total economic spillover effects triggered by direct consumption also increased significantly. Total economic spillover effects in 2009 and 2010 were US$1,546.32million and US$2,712.27million, respectively. This reached US$4,702.79 million in 2013. Consequently, the amount of employments was increased by 5,362(2008), 18,833(2009), 33,034(2010), 35,549(2011), 51,533(2012) and 57,277(2013).

Income inducements and crude value added inducements for employment income increased from US$18.988 million and US$346.08 million (2008) to US$2,028.45 million and US$3,697.01 million(2013). Since Taiwan relaxed its tourism policies toward Chinese tourists, employment income inducements have increased by a total of US$7,139.18 million. Crude value added inducements also increased by a total of US$13,011.72 million. Additionally, a total of 201,588employments were created. To Taiwan's current economic downturn, the economic benefits brought by the vigorous spending power

of Chinese tourists are extremely crucial. These benefits might have moderated the rise of unemployment in recent years.

Table 2: Economic Effects Generated by Chinese Tourists

Period	(1) Total Spillover Effects	(2) Induced Income of Employment	(3) Gross Induced Added Value	(4) Increase in Employment (Persons)
2008	44,022	18,988	34,608	5,362
2009	154,632	66,697	121,561	18,833
2010	271,227	116,988	213,220	33,034
2011	291,879	125,896	229,455	35,549
2012	423,120	182,504	332,627	51,533
2013	470,279	202,845	369,701	57,277
Total	1,655,159	713,918	1,301,172	201,588

Notes: 1. The unit of amount is ten thousands US dollars per capita. 2. The amount for year 2008 is covered for the periods from July to December.

Economic Effects of Tourism-Related Industries

Table 3 provides the estimates of the annual economic spillover effects for the tourism-related industries over past years. Overall, purchasing in the retail and accommodation services in hotels held had the highest part for the amount of Chinese tourist spending. Therefore, it generated greater economic spillover effects. Economic spillover effects in tourism-related industries in 2008 were US$232.19 million. The retail sector was the greatest one of these (US$116.67 million), followed by accommodation services (US$66.13 million). By 2013, the economic spillover effects for the retail sector and accommodations services sector remained the largest at US$1,246.26 million and US$1,024.03 million, respectively. The cumulative total economic spillover effects for these two sectors among all tourism-related industries were 50.25% and 28.48%, with the amounts of US$4,386.25 million and US$2,803.84 million, respectively. The total economic spillover effects for all tourism-related industries were US$9,086.41 million. The economic spillover effects for telecommunications services, insurance services, and arts, entertainment, and leisure services sectors were smaller. Their cumulative amounts since liberalization were US$272.43 million, US$162.65 million, and US$72.65 million, respectively. In the 1980s, there were changes in Taiwan's economic structure with the liberalization and internationalization of its market. The proportion of total product held by the manufacturing industry has

Table 3: The Economic Spillover Effects Generated by Tourism-Related Industries

Period	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Total
2008	1,972	6,613	1,721	642	432	171	11,667	23,219
2009	6,927	23,227	6,046	2,257	1,520	602	40,978	81,557
2010	12,151	40,741	10,604	3,959	2,666	1,056	71,877	143,053
2011	13,076	43,843	11,411	4,260	2,868	1,136	77,349	153,943
2012	18,956	63,557	16,542	6,175	4,158	1,647	112,128	223,162
2013	21,068	102,403	18,386	9,950	4,621	2,653	124,626	283,707
Total	74,150	280,384	64,709	27,243	16,265	7,265	438,625	908,641

Notes: 1. The unit of amount is ten thousands US dollars per capita. 2. The amount for year 2008 is covered for the periods from July to December. 3. (1) Food Services Sector; (2) Accommodation Services Sector; (3)Land Transportation Sector; (4)Telecommunication Service Sector; (5)Insurance Sector; (6)Art, Entertainment, and Leisure Services Sector; (7)Retail Sector

gradually decreased, whereas those in the service industry experienced growth. The production of tourism-related industries grew substantially as the incomes increased. The economic spillover effects for tourism-related industries of adjustment in tourism policy accounted for 52.74% of the total economic spillover effect.

Table 4 presented the results of the employment creation in tourism-related industries. The impact on the employment market indicated similarly significant results. The persons employed created in tourism-related industries accounted for 66.87% of all employment created. In 2008, only 3,588

Table 4: Employment Creation in Tourism-Related Industries

Period	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Total
2008	298	1,474	188	24	58	7	1,537	3,588
2009	1,047	5,178	659	84	206	21	5,399	12,594
2010	1,835	9,082	1,155	148	360	38	9,470	22,089
2011	1,975	9,774	1,244	159	388	41	10,191	23,771
2012	2,863	14,169	1,803	230	562	59	14,773	34,461
2013	3,182	15,748	2,004	256	625	66	16,420	38,302
Total	11,200	55,425	7,054	902	2,200	232	57,790	134,805

Notes: 1. The unit of amount is persons. 2. The amount for year 2008 is covered for the periods from July to December. 3. (1)Food Services Sector; (2)Accommodation Services Sector; (3)Land Transportation Sector; (4)Telecommunication Service Sector; (5)Insurance Sector; (6)Art, Entertainment, and Leisure Services Sector; (7)Retail Sector.

persons employed were created. However, more than 38,000 persons employed were created by 2013, a growth rate of 600%. For the industrial sector, the most persons were employed in both the retail sector and accommodations services sectors. Among the 134,805 persons employed created during the sample period, these two sectors added 57,790(42.87%) and 55,425(41.12%) persons employed, respectively.

CONCLUDING REMARKS

Its economic growth is easily influenced by international prosperity, since Taiwan is a relatively small trade-oriented economy. In particular, encountering the 2008 financial crisis, exports declined and the unemployment rate rose significantly. Its domestic economy remained in a downturn in Taiwan. Accordingly, the government adjusted the tourism policy toward Chinese tourists, hoping that it would enhance its economic prosperity and create employment opportunities. However, the economic effects generated by the tourism policy adjustment on Taiwanese economy were unclear. Therefore, we have employed both the industry-related spillover model and the employment-created model to estimate the economic scale and the persons employed created of relaxing tourism policy toward Chinese people, and to investigate the extent of the effects within tourism-related industries.

US$16,551.59 million in total economic spillover effects has been created. Among these effects, employment income inducements and crude value added inducements increased by US$7,139.18 million and US$13,011.72 million, respectively. A total of 201,588 persons employed have been created. It alleviated the pressure of continually increasing unemployment rate in Taiwan. Economic spillover effects in the tourism-related industries have been substantial, with a total economic spillover effect of US$9,086.41 million. There are 52.74% of overall economic spillover effects. The retail sector's US$4,386.25 million and accommodation services' US$2,803.84 were the greatest. There were 134,805 persons employed in tourism-related industries. The most employments were created in both the retail and accommodations services sectors, with 57,790 and 55,425, respectively.

As the mentioned above, even though the change in the tourism policy toward Chinese citizens brings the economic benefits and creates a great amount of persons employed for Taiwan, we concern more whether the benefits are sustainable. The earlier economic development in Taiwan was mainly driven by an increase in the capital investments, which is an investment-dependent type. However, gradually the primary sector and the secondary sector of industries shrank with economic development. Instead, the tertiary sector of industry increases dramatically and now accounts for the 70% of Taiwan's industrial structure, which plays an important role on the economic development. Especially right after the world financial tsunami in 2008, Taiwan might reconsider the new direction in industrial development and switch the gear from the investment-dependent and the export-dependent types into the service industry consumption one. Therefore, we could not overemphasize the role of tourism-related industries on the economic development.

With the economic development, the output and employment of service industry has accounted for more than the half of the aggregate production. Our finding in the present study suggested the change in the tourism policy could lead to the enormous benefits of the economy and employment for Taiwan. Could only the relaxing in tourism policy toward Chinese tourists sustain tourism-related industries in Taiwan? The answer could be little positive since the international political situation and international economic environment often play a key role on the industry development of the country. The industrial structure would make a change as those environmental conditions are various. Therefore, Taiwan should make an appropriate adjustment in policy to develop tourism industry. We encounter the following challenges: (1)There are tourists from other countries around the world who have patterns of consumption being different from those. (2)Could the consumption patterns remain unchanged in the future? (3)Service quality provided in Taiwan also needs to make adjustments while tourists' preferences change or tourists have higher income and education levels. The sustainable tourism industry should be able to meet the consumer needs; otherwise the effect of tourism policy adjustments might be not significant. Moreover, the tourism industry in Taiwan would not only need to improve service quality, but also it should provide more services to consumers in the future. In other words, the tourism services have to satisfy demands of "the shopping-type" tourists, and these industries could also offer more different tourism services to the diverse kinds of tourists such as "the leisure type", "the leisure and shopping type" or " the economy type". The economic spillover effects generated by the relaxation of tourism policy were brief and transient. It could not fundamentally overcome Taiwan's economic challenges. Only through the sustainable management of the tourism-related industry could long-run economic effects be created. Taiwan should continue to improve the quality of the tourism sector. The overall depth of the tourism-related industry should also be strengthened.

REFERENCES

Becken S. (2003) Chinese Tourism to New Zealand. Landcare Research. 2003. Available: <http://www.landcareresearch.co.nz/research/sustainablesoc/tourism/documents/Chinese_tourism.pdf>.

Becken, S. & Lennox, J. (2012) "Implications of a Long-Term Increase in Oil Prices for Tourism," *Tourism Management*, vol. 33, p. 133-142.

Cai L. A, Boger, C. & O'Leary, J. (1999) "The Chinese travelers to Singapore, Malaysia, and Thailand: An Unique Chinese Outbound Market," *Asia Pacific Journal of Tourism Research*, vol. 3(2), p. 2-13.

Cai, L. A., You, X. & O'Leary, J. T. (2001) "Profiling the U.S.-Bound Chinese Travelers by Purpose of Trip," *Journal of Hospitality Marketing & Management*, vol. 7(4), p. 3-16.

Chien, C. M., Hong, C. Y. & Li, J. F. (2014) "Spillover Effects of Tourism Policy Changes on Hospitality Industries," *Global Journal of Business Research*, vol. 8(2), p. 111-124.

Falk, M. (2010) "A Dynamic Panel Data Analysis of Snow Depth and Winter Tourism," *Tourism Management*, vol. 31, p. 912-924.

Goh, C. & Law, R. (2002) Modeling and Forecasting Tourism Demand for Arrivals with Stochastic Nonstationary Seasonality and Intervention," *Tourism Management*, vol. 23(5), p. 499-510.

Hong, C. Y. & Li, J. F. & Chiou K. C. (2014) "A Comparison of Tourism Economic Effects before and after Aviation Deregulation," *Empirical Economics Letters*, vol.13, p. 82-87.

Hong, C. Y., Li, J. F., Chiou, K. C. & Lo, M. M. (2014) "The Tax Revenue Effect from Change in Tourism Policy toward Chinese People," *Empirical Economics Letters*, vol.13(8), p. 881-886.

Huang, S-S, & Hsu, C. H. C. (2005) "Mainland Chinese Residents' Perceptions and Motivations of visiting Hong Kong: Evidence from Focus Group Interviews," *Asia Pacific Journal of Tourism Research*, vol. 10(2), p. 191-205.

Jang, S. C. Yu, L. & Pearson, T. (2003) "Chinese Travelers to the United States: A Comparison of Business Travel and Visiting Friends and Relatives," *Tourism Geographies*, vol. 5(1), p. 87-108.

Kim, S. S., Guo, Y.-Z. & Agrusa, J. (2005) "Preference and Positioning Analyses of Overseas Destinations by Mainland Chinese Outbound Pleasure Tourists," *Journal of Travel Research*, Available: <http://jtr.sagepub.com/cgi/content/abstract/44/2/212>.

Li, X. R., Harrill, R, Uysal, M., Burnett, T. & Zhan X-F. (2010) Estimating the Size of the Chinese Outbound Travel Market: A Demand-Side Approach," *Tourism Management*, vol.31 (2), p. 250-259.

Li, J. F., Hong, C. Y. & Chien, C. M. (2013) "The Impact of Change in Tourism Policy on Employment and Added Value in Hospitality and Restaurant Industries," *International Research Journal of Finance and Economics*, p. 96-106.

Liu, C. H., Hong, C.Y., & Li, J. F. (2013) "An Industry-Related Spillover Analysis of the Impact of Chinese Tourists on the Taiwanese Economy," *Tourism Management*, vol. 36, p. 423-425.

Lo, M. M., Tang, G. L., Hong, C.Y. & Li, J. F. (2014) "The Taxation Effects of Tourism under Aviation Deregulation in a Small Open Economy," *Global Journal of Business Research*, vol. 8(5), p. 85-96.

Mitchell, J. (2012) "Value Chain Approaches to Assessing the Impact of Tourism on Low-Income Households in Developing Countries," *Journal of Sustainable Tourism*. vol. 20(3), p. 457-475.

Pesaran H, Shin Y, Smith R. P. (1999) "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels," *Journal of the American Statistical Association*, vol. 94, p.621-634.

Qiu, H. Z. & Lam, T. (1999) "An analysis of Mainland Chinese Visitors' Motivations to Visit Hong Kong," *Tourism Management*, vol. 20(5), p. 587-594.

Qiu, HZ, Qu H. (1996) "The Trends of China's Outbound Travel to Hong Kong and Their Implications," *Journal of Vacation Marketing*, vol. 2(4), p. 373-381.

Qu, H, Lam S. (1997) "A Travel Demand Model for Mainland Chinese Tourists to Hong Kong," *Tourism Management*, vol. 18(8), p. 593-597.

Seetanah, B. (2011) "Assessing the Dynamic Economic Impact of Tourism for Island Economies. *Annals of Tourism Research*," vol. 38(1), p. 291-308.

United Nations World Tourism Organization (UNWTO). (2003) "Chinese Outbound Tourism," (Madrid, Spain: UNWTO), p. 31-122.

United Nations World Tourism Organization (UNWTO). (2008) "The Chinese Outbound Travel Market with Special Insight into the Image of Europe as a Destination,"   (Madrid, Spain: UNWTO), p. 47-54.

Wan, Y. K. P.   (2012) "The Social, Economic and Environmental Impacts of Casino Gaming in Macao: The Community Leader Perspective," *Journal of Sustainable Tourism*, vol. 20(5), p. 737-755.

Wang, Y. & Sheldon, P. J. (1996) "The Sleeping Dragon Awakes: The Outbound Chinese Travel Market," *Journal of Travel & Tourism Marketing*, vol. 4(4), p. 41-54.

Wang, S-M. & Wen, P-C. (2010) "The Economic Effects of Chinese Tourists on Taiwan Economy," *Prospect Quarterly*, vol. 11(3), p. 133-175.

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